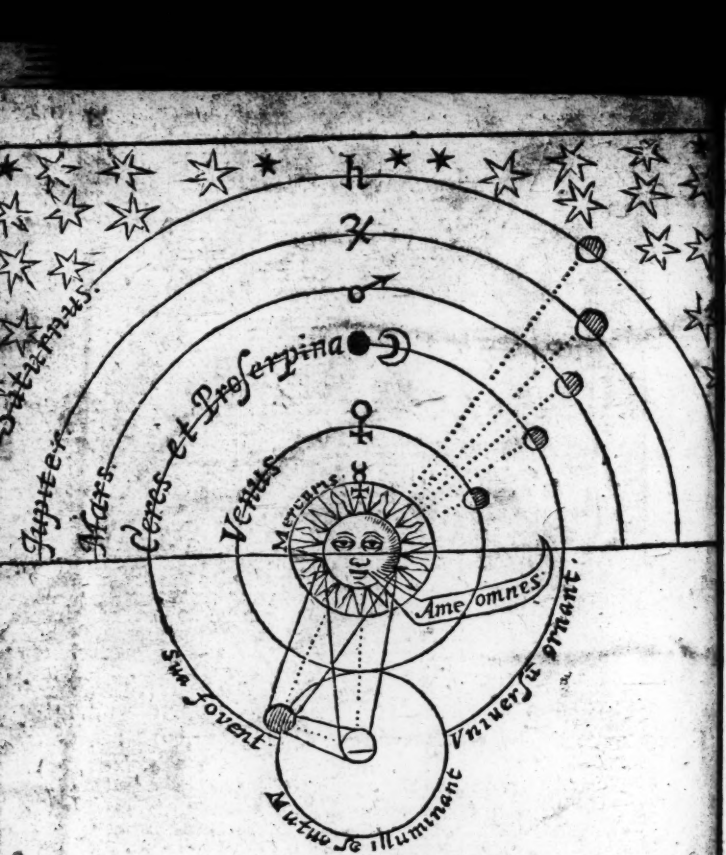
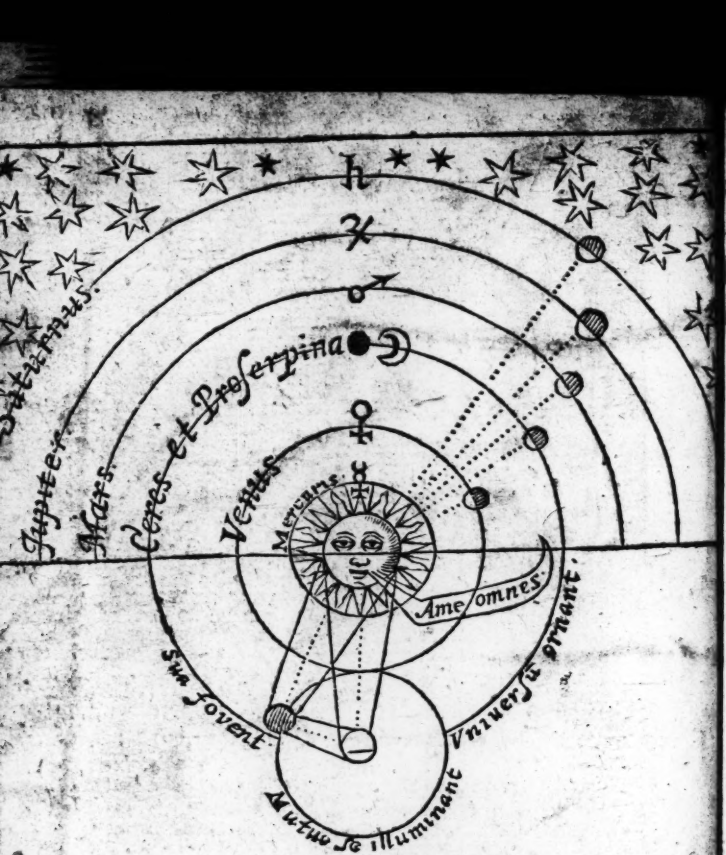


THE DISCOVERY OF A WORLD IN THE MOONE.



THE DISCOVERY OF A WORLD IN THE MOONE.

OR,

A DISCOVRSE

Tending,

TO PROVE,

that 'tis probable there may be another habitable World in that Planet.

Quid tibi inquis iſta proderunt? Si nihil aliud, hoc certè, ſciam omnia anguſta eſſe. SENECA. Præf. ad 1. Lib. N. Q.

LONDON,
Printed by E.G. for *Michael Sparke* and *Edward Forreſt*, 1638.

Perlegi hæc παράδοξα *& novitatis gratiâ typis mandari permitto.*

Mart. 29. 1638.

THO. WEEKES *R. P. Epiſc. Lond. Cap. Domeſt.*

To the Reader.

IF amongſt thy leiſure houres thou canſt ſpare any for the peruſall of this diſcourſe, and doſt looke to find ſomewhat in it which may ſerve for thy information and benefit: let me then adviſe thee to come unto it with an equall minde, not ſwayed by prejudice, but indifferently reſolved to aſſent unto that truth which upon deliberation ſhall ſeeme moſt probable unto thy reaſon, and then I doubt not, but either thou wilt agree with mee in this aſſertion, or at leaſt not thinke it to be as farre from truth, as it is from common opinion.

Two cautions there are which I would willingly admoniſh thee of in the beginning.

1. *That thou ſhouldſt not here looke to find any exact, accurate Treatiſe, ſince this diſcourſe was but the fruit of ſome lighter ſtudies, and thoſe too hudled up in a ſhort time, being firſt thought of and finiſhed in the ſpace of ſome few weekes, and therefore you cannot in reaſon expect, that it ſhould be ſo poliſhed, as perhaps, the ſubject would require, or the leiſure of the Author might have done it.*

2. *To remember that I promiſe onely probable arguments for the proofe of this opinion, and therefore you muſt not looke that every conſequence ſhould be of an undeniable dependance, or that the truth of each argument ſhould be meaſured by its neceſſity. I grant that ſome Aſtronomicall appearances may poſſibly be ſolved otherwiſe then here they are. But the thing I aime at is this, that probably they may ſo be ſolved, as I have here ſet them downe: Which, if it be granted (as I thinke it muſt) then I doubt*

doubt not, but the indifferent reader will find some satisfaction in the maine thing that is to be proved.

Many ancient Philosophers of the better note, have formerly defended this assertion, which I have here laid downe, and it were to be wished, that some of us would more apply our endeavours unto the examination of these old opinions, which though they have for a long time lien neglected by others, yet in them may you finde many truths well worthy your paines and observation. Tis a false conceit, for us to thinke, that amongst the ancient variety and search of opinions, the best hath still prevailed. Time (saith the learned Verulam) seemes to be of the nature of a river or streame, which carrieth downe to us that which is light, or blowne up, but sinketh that which is weighty and solid.

It is my desire that by the occasion of this discourse, I may raise up some more active spirit to a search after

after other hidden and unknowne truths. Since it muſt needes be a great impediment unto the growth of ſciences, for men ſtill ſo to plod on upon beaten principles, as to be afraid of entertaining any thing that may ſeeme to contradict them. An unwillingneſſe to take ſuch things into examination, is one of thoſe errours of learning in theſe times obſerved by the judicious Verulam. *Queſtionleſſe there are many ſecret truths, which the ancients have paſſed over, that are yet left to make ſome of our age famous for their diſcovery.*

If by this occaſion I may provoke any reader to an attempt of this nature, I ſhall then thinke my ſelfe happy, and this worke ſucceſſefull.

Farewell.

The First Proposition, by way of Preface.

That the strangenesse of this opinion is no sufficient reason why it should be rejected, -because other certaine truths have beene formerly esteemed ridiculous, and great absurdities entertayned by common consent.

THere is an earnestnesse and hungering after novelties, which doth still adhere unto all our natures, and it is part of that primitive image, that wide extent and infinite capacity at first created in the heart of man, for this since its depravation in

Adam perceiving it ſelfe altogether emptied of any good doth now catch after every new thing, conceiving that poſſibly it may finde ſatisfaction among ſome of its fellow creatures. But our enemy the divell (who ſtrives ſtill to pervert our gifts, and beate us with our owne weapons) hath ſo contriv'd it, that any truth doth now ſeeme diſtaſtefull for that very reaſon, for which errour is entertain'd--Novelty, for let but ſome upſtart hereſie be ſet abroach, and preſently there are ſome out of a curious humour; others, as if they watched an occaſion of ſingularity, will take it up for canonicall, and make it part of their creede and profeſſion;-whereas ſolitary truth cannot any where finde ſo ready entertainement; but the ſame Novelty which is eſteemed the commendation of errour and makes that acceptable, is counted the fault of

of truth, and cauſes that to bee rejected. How did the incredulous World gaze at *Columbus* when he promiſed to diſcover another part of the earth, and he could not for a long time by his confidence, or arguments, induce any of the Chriſtian Princes, either to aſſent unto his opinion, or goe to the charges of an experiment. Now if he who had ſuch good grounds for his aſſertion, could finde no better entertainement among the wiſer ſort, and upper end of the World; 'tis not likely then that this opinion which I now deliver, ſhall receive any thing from the men of theſe daies, eſpecially our vulgar wits, but misbeliefe or deriſion. It hath alwaies beene the unhappineſſe of new truths in Philoſophy, to be derided by thoſe that are ignorant of the cauſes of things, and reiected by others whoſe perverſeneſſe ties them to the con-

trary opinion, men whoſe envious pride will not allow any new thing for truth which they themſelves were not the firſt inventors of. So that I may iuſtly expect to be accuſed of a pragmaticall ignorance, and bold oſtentation, eſpecially ſince for this opinion *Xenophanes*, a man whoſe authority was able to adde ſome credit to his aſſertion could not eſcape the like cenſure from others. For *Natales Comes* ſpeaking of that Philoſopher, and this his opinion, ſaith thus, *Nonnulli ne nihil ſciſſe videantur, aliqua novo monſtra in Philoſophiã introducunt, ut alicuius rei inventores fuiſſe appareant.* Some "there are who leaſt they might "ſeeme to know nothing, will "bring up monſtrous abſurdi-"ties in Philoſophy, that ſo af-"terward they may bee famed "for the invention of ſomewhat. The ſame author doth alſo in another place accuſe *Anaxagoras* of

Mytholog. lib. 3. c. 17.

Lib. 7. c. 1.

of folly for the ſame opinion, *Eſt enim non ignobilis gradus ſtultitiæ, vel ſi neſcias quid dicas, tamen velle de rebus propoſitis hanc vel illam partem ſtabilire.* 'Tis none of the worſt kindes of folly, boldly to affirme one ſide or other, when a man knows not what to ſay.

If theſe men were thus cenſur'd, I may iuſtly then expect to be derided by moſt, and to be believed by few or none; eſpecially ſince this opinion ſeemes to carry in it ſo much ſtrangeneſſe, ſo much contradiction to the generall conſent of others. But how ever, I am reſolved that this ſhall not be any diſcouragement, ſince I know that it is not the common opinion of others that can either adde or detract from the truth. For,

1. Other truths have beene formerly eſteemed altogether as ridiculous as this can be.

2 Groſſe abſurdities have beene entertained by generall opinion.

I ſhall give an inſtance of each, that ſo I may the better prepare the Reader to conſider things without a prejudice, when hee ſhall ſee that the common oppoſition againſt this which I affirme cannot any way derogate from its truth.

1. Other truths have beene formerly accounted as ridiculous as this, I ſhall ſpecifie that of the Antipodes, which have beene denied and laught at by many wiſe men and great Schollers, ſuch as were *Herodotus*, St. *Auſtine*, *Lactantius*, the *Venerable Bede*, *Lucretius* the Poet, *Procopius*, and the voluminous *Abulenſis* with others. *Herodotus* counted it ſo horrible an abſurdity, that hee could not forbeare laughing to thinke of it. Γελῶ δὲ ὁρῶν γῆς περιόδους γεγράψαντας, πολλὰς ἤδη

ἤδη δὲ ἀλόγιστα τόσον ἔχοντας ἐξηγησάμενον οἱ Ὠκεανόν τε ῥέοντα γεγράφασι, πίειξ τῆν τε γῆν ἔσαν κυκλοτερέα ὡς ἀπὸ τόρνε. "I cannot chooſe but laugh, "(ſaith he) to ſee ſo many men "venture to deſcribe the earths "compaſſe, relating thoſe things "that are without all ſenſe, as "that the Sea flowes about the "World, and that the earth it "ſelfe is round as an Orbe. But this great ignorance is not ſo much to be admired in him, as in thoſe learneder men of later times, when all ſciences began to flouriſh in the World. Such was Saint *Auſtin* who cenſures that relation of the Antipodes to be an incredible fable, and with him agrees the eloquent *Lactantius*, *quid illi qui eſſe contrarios veſtigiis noſtris Antipodes putant? num aliquid loquuntur? aut eſt quiſpiam tam ineptus, qui credat eſſe homines, quorum veſtigia ſunt ſuperiora quàm capita? aut ibi quæ apud nos jacent inver-*

de civit. Dei. lib. 16. cap. 9.

Inſtitut. l. 3. c. 24.

ſa pendere? fruges & arbores deorſum verſus creſcere, pluvias & nives, & grandinem ſurſum verſus cadere in terram? & miratur aliquis hortos penſiles inter ſeptem mira narrari, quum Philoſophi, & agros & maria, & urbes & montes penſiles faciunt? &c. What (ſaith "he) are they that thinke there "are Antipodes, ſuch as walke "with their feete againſt ours? "doe they ſpeake any likely-"hood? or is there any one ſo fooliſh as to believe that there "are men whoſe heeles are high-"er than their heads? that "things which with us doe lie "on the ground doe hang there? "that the Plants and Trees "grow downewards, that the "haile, and raine, and ſnow fall "upwards to the earth? and "doe wee admire the hanging "Orchards amongſt the ſeven "wonders, whereas here the "Philoſophers have made the "Field and Seas, the Cities and Moun-

"mountaines hanging. What "ſhall wee thinke (ſaith hee in *Plutarch*) that men doe clyng to that place like wormes, or hang by their clawes as Cats, or if wee ſuppoſe a man a little beyond the Center, to be digging with a ſpade? is it likely (as it muſt be according to this opinion) that the earth which hee looſened, ſhould of it ſelfe aſcend upwards? or elſe ſuppoſe two men with their middles about the center, the feete of the one being placed where the head of the other is, and ſo two other men croſſe them, yet all theſe men thus ſituated according to this opinion ſhould ſtand upright, and many other ſuch groſſe conſequences would follow (ſaith he) which a falſe imagination is not able to fancy as poſſible. Vpon which conſiderations, *Bede* alſo denies the being of any Antipodes, *Neq; enim Antipodarum*

De ratione temporum, Cap 32.

rum ullatenus eſt Fabulis accommodandus aſſenſus, Nor ſhould "wee any longer aſſent to the "Fable of Antipodes. So alſo *Lucretius* the Poet ſpeaking of the ſame ſubject, ſaies,

De nat. rerum, Lib. 1.

Sed vanus ſtolidis hæc omnia finxerit error.

That ſome idle fancy faigned theſe for fooles to believe. Of this opinion was *Procopius Gazæus*, but he was perſwaded to it by another kinde of reaſon; for he thought that all the earth under us was ſunke in the water, according to the ſaying of the *Pſalmiſt*, Hee hath founded the earth upon the Seas, and therefore he accounted it not inhabited by any. Nay *Toſtatus* a man of later yeeres and generall learning doth alſo confidently deny that there are any ſuch Antipodes, though the reaſon which he urges for it be not ſo abſurd as the former, for the Apoſtles, ſaith he, travelled through the whole habi-

Comment. in 1. Cap. Gen.

Pſal. 24. 2.

Comment. in 1. Geneſ.

habitable world, but they never paſſed the Equinoctiall; and if you anſwer that they are ſaid to goe through all the earth, becauſe they went through all the knowne world, hee replies, that this is not ſufficient, ſince Chriſt would have all men to be ſaved, and come to the knowledge of his truth, and therefore 1 Tim. 2. 4.
'tis requiſite that they ſhould have travelled thither alſo, if there had been any inhabitants, eſpecially ſince he did expreſſely command them to goe and teach all nations, and preach the Goſpell through the whole Mat. 28. 19.
world, and therefore he thinkes that as there are no men, ſo neither are there ſeas, or rivers, or any other conveniency for habitation: 'tis commonly related of one *Virgilius*, that he was excommunicated and condemned for a Heretique by *Zachary* Biſhop of *Rome*, becauſe hee was not of the ſame opinion. But

Baronius

Annal. Eccleſ. A. D. 748.

Baronius ſaies, it was becauſe hee thought there was another habitable world within ours. However, you may well enough diſcerne in theſe examples how confident many of theſe great Schollars were in ſo groſſe an errour, how unlikely, what an incredible thing it ſeemed to them, that there ſhould be any Antipodes, and yet now this truth is as certaine and plaine, as ſenſe or demonſtration can make it. This then which I now deliver is not to be rejected, though it may ſeeme to contradict the common opinion.

2. Groſſe abſurdities have beene entertained by generall conſent. I might inſtance in many remarkeable examples, but I will onely ſpeake of the ſuppoſed labour of the Moone in her eclipſes, becauſe this is neereſt to the chiefe matter in hand, and was received as a common opinion amongſt many

ny of the ancients, and therefore *Plutarch* ſpeaking of a Lunary eclipſe, relates, that at ſuch times 'twas a cuſtome amongſt the *Romanes* (the moſt civill and learned people in the world) to ſound braſſe Inſtruments, and hold great torches toward the heaven. Τῶν δὲ Ρωμαίων (ὥσπερ ἔστιν ἐνομισμένον) χαλκοῦ τὸ παπάγεις ἀνακαλυμμένων τὸ φῶς αὐτῆς καὶ πυρὰ πολλὰ δᾳλοῖς καὶ δαυλοῖς ἀνεχόντων πρὸς τὸν οὐρανόν. for by this meanes they ſuppoſed the Moone was much eaſed in her labours, and therfore *Ovid* calls ſuch loud Inſtruments the auxiliaries or helpes of the Moone

In vita Paul. Æmil.

Cum fruſtra reſonant æra auxiliaria Lunæ.

Metam. Lib. 4.

and therefore the Satyriſt too deſcribing a loud ſcold, ſaies, ſhe was able to make noiſe enough to deliver the labouring Moone.

Una laboranti poterit ſuccurrere Lunæ.

Iuven. Sat. 6

Now the reaſon of all this their ceremonie, was, becauſe they feared the world would fall aſleepe,

aſleepe, when one of its eyes beganne to wincke, and therefore they would doe what they could by loud ſounds to rouſe it from its drowſineſſe, and keepe it awake by bright torches, to beſtow that light upon it which it beganne to loſe. Some of them thought hereby to keepe the Moone in her orbe, whereas otherwiſe ſhe would have fallen downe upon the earth, and the world would have loſt one of its lights, for the credulous people believed, that Inchanters and Witches could bring the Moone downe, which made *Virgil* ſay,

Carmus & è cœlo poſſunt deducere Lunam.

And thoſe Wizards knowing the times of her eclipſes, would then threaten to ſhew their skill, by pulling her out of her orbe. So that when the ſilly multitude ſaw that ſhe began to looke red, they preſently feared they ſhould loſe the benefit of her light, and therefore made a great noiſe that ſhe

ſhe might not heare the ſound of thoſe Charmes, which would otherwiſe bring her downe, and this is rendred for a reaſon of this cuſtome by *Pliny* and *Propertius*:

Nat. Hiſt. Lib. 2. c. 12.

Cautus & è curru lunam deducere tentant,
Et facerent, ſi non æra repulſa ſonent.

Plutarch gives another reaſon of it, and he ſaies, 'tis becauſe they would haſten the Moone out of the darke ſhade wherein ſhe was involv'd, that ſo ſhe might bring away the ſoules of thoſe Saints that inhabit within her, which cry out by reaſon they are then deprived of their wonted happineſſe, and cannot heare the muſicke of the Spheares, but are forced to behold the torments, and wailing of thoſe damned ſoules which are repreſented to them as they are tortured in the region of the aire, but whether this or what ever elſe was the meaning of this ſuperſtition, yet certainly 'twas a very ridiculous cuſtome,

ſtome, and bewrayed a great ignorance of thoſe ancient times, eſpecially ſince it was not onely received by the vulgar, ſuch as were men of leſſe note and learning, but believed alſo, by the more famous and wiſer ſort, ſuch as were thoſe great Poets, *Steſichorus* and *Pindar*. And not onely amongſt the more ſottiſh heathens, who might account that Planet to be one of their Gods, but the primitive Chriſtians alſo were in this kinde guilty, which made S. *Ambroſe* ſo tartly to rebuke thoſe of his time, when he ſaid, *Tum turbatur carminibus Globus Lunæ, quando calicibus turbantur & oculi.* When "your heads are troubled with "cups, then you thinke the "Moone to be troubled with "charmes.

And for this reaſon alſo did *Maximus* a Biſhop, write a Homily againſt it, wherein hee ſhewed the abſurditie of that fooliſh

Turinenſ. Epiſc.

fooliſh ſuperſtition. I remember that *Ludovicus Vives* relates a more ridiculous ſtory of a people that impriſoned an Aſſe for drinking up the Moone, whoſe image appearing in the water was covered with a cloud as the Aſſe was drinking, for which the poore beaſt was afterward brought to the barre to receive a ſentence according to his deſerts, where the grave Senate being ſet to examine the matter, one of the Counſell (perhaps wiſer than the reſt) riſes up, and out of his deepe judgement thinkes it not fit that their Towne ſhould loſe its Moone, but that rather the Aſſe ſhould bee cut up and that taken out of him, which ſentence being approved by the reſt of thoſe Politicians, as the ſubtilleſt way for the concluſion of the matter was accordingly performed. But whether this tale were true or no I will not queſtion, how-

ever there is abſurdity enough in that former cuſtome of the ancients that may confirme the truth to be proved, and plainely declare the inſufficiency of common opinion to adde true worth or eſtimation unto any thing. So that from that which I have ſaid may be gathered thus much.

1. That a new truth may ſeeme abſurd and impoſſible not onely to the vulgar, but to thoſe alſo who are otherwiſe wiſe men and excellent ſchollers; and hence it will follow that every new thing which ſeemes to oppoſe common principles is not preſently to bee rejected, but rather to bee pry'd into with a diligent enquiry, ſince there are many things which are yet hid from us, and reſerv'd for future diſcovery.
2. That it is not the commonneſſe of an opinion that can priviledge it for a truth, the wrong

wrong way is ſometime a well beaten path, whereas the right way (eſpecially to hidden truths) may be leſſe trodden and more obſcure.

True indeed, the ſtrangeneſſe of this opinion will detract much from its credit; but yet we ſhould know that nothing is in its ſelfe ſtrange, ſince every naturall effect has an equall dependance upon its cauſe, and with the like neceſſity doth follow from it, ſo that 'tis our ignorance which makes things appeare ſo, and hence it comes to paſſe that many more evident truths ſeeme incredible to ſuch who know not the cauſes of things: you may as ſoone perſwade ſome Countrey peaſants that the Moone is made of greene Cheeſe (as we ſay) as that 'tis bigger than his Cart-wheele, ſince both ſeeme equally to contradict his ſight, and he has not reaſon enough to leade him farther than

his ſenſes. Nay ſuppoſe (ſaith *Plutarch*) a Philoſopher ſhould bee educated in ſuch a ſecret place, where hee might not ſee either Sea or River and afterwards ſhould bee brought out where one might ſhew him the great Ocean telling him the quality of that water that it is brackiſh ſalt and not potable, and yet there were many vaſt creatures of all formes living in it, which make uſe of the water as we doe of the ayre, queſtionleſſe he would laugh at al this as being monſtrous lies, and fables without any colour of truth. Juſt ſo will this truth which I now deliver appeare unto others; becauſe we never dreamt of any ſuch matter as a world in the Moone, becauſe the ſtate of that place hath as yet beene vailed from our knowledge, therefore we can ſcarcely aſſent to any ſuch matter. Things are very hardly received which are altogether

ſtrange

ſtrange to our thoughts and our ſenſes. The ſoule may with leſſe difficulty be brought to believe any abſurdity, when as it has formerly beene acquainted with ſome colours and probabilities for it, but when a new, and an unheard of truth ſhall come before it, though it have good grounds and reaſons, yet the underſtanding is afraid of it as a ſtranger, and dares not admit it into its beliefe without a great deale of reluctancy and tryall. And beſides things that are not manifeſted to the ſenſes, are not aſſented unto without ſome labour of mind, ſome travaile and diſcourſe of the underſtanding, and many lazie ſoules had rather quietly repoſe themſelves in an eaſie errour, then take paines to ſearch out the truth. The ſtrangeneſſe then of this opinion which I now deliver will be a great hinderance to its beliefe, but this is not to be re-

ſpected by reaſon it cannot bee helped. I have ſtood the longer in the Preface, becauſe that prejudice which the meere title of the booke may beget cannot eaſily be removed without a great deale of preparation, and I could not tell otherwiſe how to rectifie the thoughts of the reader for an impartiall ſurvey of the following diſcourſe.

I muſt needs confeſſe, though I had often thought with my ſelfe that it was poſſible there might be a world in the Moone, yet it ſeemed ſuch an uncouth opinion that I never durſt diſcover it, for feare of being counted ſingular and ridiculous, but afterward having read *Plutarch*, *Galileus*, *Keplar*, with ſome others, and finding many of mine owne thoughts confirmed by ſuch ſtrong authority, I then concluded that it was not onely poſſible there might be, but probable that there was another habi-

habitable world in that Planet. In the profecuting of this aſſertion I ſhall firſt endeavour to cleare the way from ſuch doubts as may hinder the ſpeed or eaſe of farther progreſſe; and becauſe the ſuppoſitions imply'd in this opinion may ſeeme to contradict the principles of reaſon or faith, it will be requiſite that I firſt remove this ſcruple ſhewing the conformity of them to both theſe, and proving thoſe truths that may make way for the reſt, which I ſhall labour to performe in the ſecond, third, fourth, and fifth Chapters, and then proceede to confirme ſuch propoſitions, which doe more directly belong to the maine point in hand.

Propoſition 2.

That a plurality of worlds doth not contradict any principle of reaſon or faith.

IT Is reported of *Ariſtotle* that when hee ſaw the bookes of *Moſes* he commended them for ſuch a majeſticke ſtile as might become a God, but withall hee cenſured that manner of writing to be very unfitting for a Philoſopher becauſe there was nothing proved in them, but matters were delivered as if they would rather command than perſwade beliefe. And 'tis obſerved that hee ſets downe nothing himſelfe, but he confirmes it by the ſtrongeſt reaſons that may be found, there being ſcarce an argument of force for any ſubject in Philoſophy which may not bee picked out of his

his writings, and therefore 'tis likely if there were in reason a necessity of one onely world, that hee would have found out some such necessary proofe as might confirme it: Especially since hee labours for it so much in two whole Chapters. But now all the arguments which he himselfe urges in this subject, are very weake and farre enough from having in them any convincing power. Therefore 'tis likely that a plurality of worlds doth not contradict any principle of reason. However, I will set downe the two chiefe of his arguments from his owne workes, and from them you may guesse the force of the other. The 1 is this, since every heavy body doth naturally tend downwards, and every light body upwards, what a hudling and confusion must there bee if there were two places for gravity and two places for lightnesse: for it is

De Cælo l.1.c.8.9.

ibid.

is probable that the earth of that other world would fall downe to this Centre, and ſo mutually the aire and fire here aſcend to thoſe Regions in the other, which muſt needs much derogate from the providence of nature, and cauſe a great diſorder in his workes. To this I anſwer, that if you will conſider the nature of gravity, you will plainely ſee there is no ground to feare any ſuch confuſion, for heavineſſe is nothing elſe but ſuch a quality as cauſes a propenſion in 'its ſubject to tend downewards towards its owne Centre, ſo that for ſome of that earth to come hither would not bee ſaid a fall but an aſcenſion, ſince it moved from its owne place, and this would be impoſſible (ſaith *Rxvio*) becauſe againſt nature, and therefore no more to bee feared than the falling of the Heavens.

De Cælo l.1.c 9.q.1.

Another

Another argument hee had from his maſter *Plato*, that there is but one world, becauſe there is but one firſt mover, God.

Metaphyſ. l.12.c.8. Diog. Laert. lib 3.

But here I may deny the conſequence, ſince a plurality of worlds doth not take away the unity of the firſt mover. *Ut enim forma ſubſtantialis, ſic primum efficiens apparentem ſolummodo multiplicitatem induit per ſignatam materiam* (ſaith a Countreyman of ours.) As the ſubſtantiall forme, ſo the efficient cauſe hath onely an appearing multiplicity from its particular matter. You may ſee this point more largely handled, and theſe Arguments more fully anſwered by *Plutarch* in his booke (why Oracles are ſilent) and *Iacob Carpentarius* in his comment on *Alcinous*.

Nic. Hill. de Philoſop. Epic. partic. 379.

But our oppoſites the Interpreters themſelves, (who too often doe *jurare in verba magiſtri*) will grant that there is not any ſtrength

ſtrength in theſe conſequences, and certainely their ſuch weake arguments could not convince that wiſe Philoſopher, who in his other opinions was wont to bee ſwayed by the ſtrength and power of reaſon: wherefore I ſhould rather thinke that he had ſome by-reſpect, which made him firſt aſſent to this opinion, and afterwards ſtrive to prove it. Perhaps it was becauſe hee feared to diſpleaſe his ſcholler *Alexander*, of whom 'tis related that he wept to heare a diſputation of another world, ſince he had not then attained the Monarchy of this, his reſtleſſe wide heart would have eſteemed this Globe of Earth not big enough for him, if there had beene another, which made the Satyriſt ſay of him,

Plutarch. de tranq. anim.

Iuvenal.

Æſtuat infœlix anguſto limine mundi.

"That he did vexe himſelfe and "ſweate in his deſires, as being "pend up in a narrow roome, when

cc when hee was confin'd but to cc one world. Before he thought to ſeate himſelfe next the Gods, but now when hee had done his beſt, hee muſt be content with ſome equall, or perhaps ſuperiour Kings.

It may be, that *Ariſtotle* was moved to this opinion, that hee might therby take from *Alexander* the occaſion of this feare and diſcontent, or elſe, perhaps, *Ariſtotle* himſelfe was as loth to hold the poſſibility of a world which he could not diſcover, as *Alexander* was to heare of one which hee could not conquer. Tis likely that ſome ſuch by-reſpect moved him to this opinion, ſince the arguments he urges for it are confeſt by his zealous followers and commentators, to be very fleight and frivolous, and they themſelves grant, what I am now to prove, that there is not any evidence in the light of naturall reaſon, which can ſufficiently

ently manifest that there is but one world.

But however some may object, would it not be inconvenient and dangerous to admit of such opinions that doe destroy those principles of *Aristotle*, which all the world hath so long followed?

Apologia pro Galileo. This question is much controverted by the *Romish* Divines; *Campanella* hath writ a Treatise in defence of it, in whom you may see many things worth the reading and notice.

To it I answer, that this position in Philosophy, doth not bring any inconvenience to the rest, since tis not *Aristotle*, but truth that should be the rule of our opinions, and if they be not both found together, wee may say to him, as hee said to his Master *Plato*, ἀμφοῖν γὰρ ὄντοιν φίλοιν, ὅσιον προτιμᾶν τὴν ἀλήθειαν. Though *Plato* were his friend, yet hee would rather adhere to truth than him. *Ethic. l. 1. c. 6.*

I

I must needes grant, that wee are all much beholden to the industry of the ancient Philosophers, and more especially to *Aristotle* for the greater part of our learning, but yet tis not ingratitude to speake against him, when hee oppoſeth truth; for then many of the Fathers would be very guilty, especially *Iustin*, who hath writ a Treatise purposely against him.

But suppose this opinion were false, yet' tis not against the faith, and so it may serve for the better confirmation of that which is true; the sparkes of errour, being forc'd out by opposition, as the sparkes of fire by the striking of the flint and steele. But suppose too that it were hereticall, and against the faith, yet may it be admitted with the same priviledge as *Aristotle*, from whom many more dangerous opinions have proceeded: as that the world is eternall,

eternall, that God cannot have while to looke after theſe inferiour things, that after death there is no reward or puniſhment, and ſuch like blaſphemies, which ſtrike directly at the fundamentalls of our Religion.

So that it is juſtly to be wondred why ſome ſhould be ſo ſuperſtitious in theſe daies, as to ſticke cloſer unto him, than unto Scripture, as if his Philoſophy were the onely foundation of all divine truthes.

Vpon theſe grounds both S^t. *Vincentius* and *Senaſinus de firmo* (as I have ſeene them quoted) thinke that *Ariſtotle* was the viol of Gods wrath, which was powred out upon the waters of Wiſdome by the third Angel; But for my part, I thinke the world is much beholden to *Ariſtotle* for all its ſciences. But yet twere a ſhame for theſe later ages to reſt our ſelves meerely upon the labours of our Fore-fathers,

Rev. 16. 4.

as

as if they had informed us of all things to be knowne, and when wee are set upon their shoulder, not to see further then they themselves did. 'Twere a superstitious, a lazie opinion to thinke *Aristotles* workes the bounds and limits of all humane invention, beyond which there could be no possibility of reaching. Certainely there are yet many things left to discovery, and it cannot be any inconvenience for us, to maintaine a new truth or rectifie an ancient errour.

But the position (say some) is directly against Scripture, for

1. *Moses* tels us but of one world, and his History of the creation had beene very imperfect if God had made another.

2. Saint *Iohn* speaking of Gods workes, sayes he made the world, in the singular number, and therefore there is but one: 'tis the argument of *Aquinas*, and he thinks that none will oppose it, but such Part 1. Q. 47. Art. 3.

who with *Democritus* esteeme some blinde chance, and not any wise providence to be the framer of all things.

3. The opinion of more worlds has in ancient times beene accounted a heresie, and *Baronius* affirmes that for this very reason *Virgilius* was cast out of his Bishopricke, and excommunicated from the Church.

Annal. Eccl. A.D. 748.

4. A fourth argument there is urged by *Aquinas*, if there bee more worlds than one, then they must either be of the same or of a diverse nature, but they are not of the same kinde, for this were needlesse and would argue an improvidence, since one would have no more perfection than the other; not of divers kinds, for then one of them could not bee called the world or universe, since it did not containe universall perfection, I have cited this argument, because it is so much stood upon by *Iulius Cæsar la Galla*, one that has purposely

ibid.

De Phænom in orbe Lunæ

posely writ a Treatise against this opinion which I now deliver, but the dilemma is so blunt that it cannot cut on either side, and the consequences so weake that I dare trust them without an answere; And (by the way) you may see this author in that place, where he endeavours to prove a necessity of one world, doth leave the chiefe matter in hand, and take much needlesse paines to dispute against *Democritus*, who thought that the world was made by the casuall concourse of *atoms* in a great *vacuum*. It should seeme that either his cause or his skill was weake, or else he would have ventured upon a stronger adversary. These arguments which I have set downe are the chiefest which I have met with against this subject, and yet the best of these hath not force enough to endanger the truth that I have delivered.

Unto the two first it may bee

anſwered, that the negative authority of Scripture is not prevalent in thoſe things which are not the fundamentals of Religion.

But you'le reply, though it doe not neceſſarily conclude, yet 'tis probable if there had beene another world, wee ſhould have had ſome notice of it in Scripture.

I anſwere, 'tis as probable that the Scripture ſhould have informed us of the planets, they being very remarkeable parts of the Creation, and yet neither *Moſes* nor *Iob*, nor the Pſalmes (the places moſt frequent in Aſtronomicall obſervations) mention any of them bnt the Sunne and Moon, and moreover you muſt know that 'tis beſides the ſcope of the Holy Ghoſt either in the new Teſtament or in the old, to reveale any thing unto us concerning the ſecrets of Philoſophy; 'tis not his intent in the new Teſtament, ſince we

we cannot conceive how it might any way belong either to the Hiſtoricall exegeticall or propheticall parts of it: nor is it his intent in the old Teſtament, as is well obſerved by our Countrey-man Maſter WRIGHT. *Non Moſis aut Prophetarum inſtitutum fuiſſe videtur Mathematicas aliquas aut Phyſicas ſubtilitates promulgare, ſed ad vulgi captum & loquendi morem quemadmodum nutrices infantulis ſolent ſeſe accommodare.* "'Tis not the endeavour of *Moſes* "or the Prophets to diſcover any "Mathematicall or Philoſophicall "ſubtilties, but rather to accómo- "date themſelves to vulgar capa- "cities, and ordinary ſpeech, as "nurſes are wont to uſe their infants. True indeed, *Moſes* is there to handle the hiſtory of the Creation, but 'tis obſerved that he does not any where meddle with ſuch matters as were very hard to be apprehended, for being to informe the common people as well

In Epiſt. ad Gilbert.

as others, he does it after a vulgar way, as it is commonly noted, declaring the originall chiefely of thoſe things which were obvious to the ſenſe, and being ſilent of other things which then could not well be apprehended. And therefore *Aquinas* obſerves that *Moſes* writes nothing of the aire, Part 1. Q. 68, Art. 3. becauſe that being inviſible the people knew not whether there were any ſuch body or no. And for this very reaſon, Saint *Auſtin* alſo thinkes that there is nothing expreſt concerning the creation of Angels which notwithſtanding are as remarkeable parts of the creatures, and as fit to be knowne as another world. And therefore the Holy Ghoſt too uſes ſuch vulgar expreſſions which ſet things forth rather as they appeare, then as they are, as when Gen. 1. 16. he cals the Moone one of the greater lights המאורת הגדלים whereas 'tis the leſt, but one that we can ſee in the whole heavens.

So

So afterwards ſpeaking of the great raine which drowned the world, he ſayes, the windowes of heaven were opened, becauſe it ſeemed to come with that violence, as if it were poured out from windowes in the Firmament. So that the phraſes which the Holy Ghoſt uſes concerning theſe things are not to bee underſtood in a literall ſenſe; but rather as vulgar expreſſions, and this rule is ſet downe by Saint *Auſtin*, where ſpeaking concerning that in the Pſalme, *who ſtretched the earth upon the waters*, hee notes that when the words of Scripture ſhall ſeeme to contradict common ſenſe or experience, there are they to be underſtood in a qualified ſence, and not according to the letter. And 'tis obſerved that for want of this rule ſome of the ancients have faſtned ſtrange abſurdities upon the words of the Scripture. So Saint *Ambroſe* eſteemed it a hereſie to thinke that the Sunne

Gen. 11.

Sr. W. Rawly c. 7. §. 6.

l. 2. in Gen. Pſal 136. 6

Wiſd. 2. 4. 17. 5. Ecclus. 43. 3. 4.

and Starres were not very hot, as being againſt the words of Scripture, *Pſalm.* 19. 6. where the Pſalmiſt ſayes that there is nothing that is hid from the heate of the Sunne. So others there are that would prove the heavens not to bee round, out of that place, *Pſal.* 104. 2. *He ſtretched out the heavens like a curtaine.* So *Procopius* alſo was of opinion that the earth was founded upon the waters, nay hee made it part of his faith, proving it out of *Pſal.* 24. 2. *Hee hath founded the earth upon the ſeas, and eſtabliſhed it upon the floods.* Theſe and ſuch like abſurdities have followed, when men looke for the grounds of Philoſophy in the words of Scripture. So that, from what hath beene ſaid, I may conclude that the ſilence of Scripture concerning any other world is not ſufficient argument to prove that there is none. Thus for the two firſt arguments.

Com. in c. 1. Gen.

Unto

Vnto the third, I may anſwer, that this very example is quoted by others, to ſhew the ignorance of thoſe primitive times, who did ſometimes condemne what they did not underſtand, and have often cenſur'd the lawfull & undoubted parts of Mathematiques for hereticall, becauſe they themſelves could not perceive a reaſon of, it and therefore their practiſe in this particular, is no ſufficient teſtimony againſt us.

But laſtly, I anſwer to all the above named objections, that the terme World, may be taken in a double ſenſe, more generally for the whole Univerſe, as it implies in it the elementary and æthereall bodies, the ſtarres and the earth. Secondly, more particularly for an inferiour World conſiſting of elements. Now the maine drift of all theſe arguments, is to confute a plurality of worlds in the firſt ſenſe, and if there were any ſuch, it might, perhaps, ſeeme ſtrange, that

that *Moses*, or S^t. *Iohn* should either not know, or not mention its creation. And *Virgilius* was condemned for this opinion, because he held *quòd sit alius mundus subterrâ, aliusq; Sol & Luna*, (as *Baronius*) that within our globe of earth, there was another world, another Sunne and Moone, and so he might seeme to exclude this from the number of the other creatures.

But now there is no such danger in this opinion, which is here delivered, since this world is said to be in the Moone, whose creation is particularly expreſt.

So that in the first sense I yeeld, that there is but one world, which is all that the arguments do prove, but understand it in the second sense, and so I affirme there may be more, nor doe any of the above named objections prove the cõtrary.

Neither can this opinion derogate from the divine Wisdome (as *Aquinas* thinkes) but rather advance

vance it, shewing a *compendium* of providence, that could make the same body a world, and a Moone; a world for habitation, and a Moone for the use of others, and the ornament of the whole frame of Nature. For as the members of the body serve not onely for the preservation of themselves, but for the use and conveniency of the whole, as the hand protects the head as well as saves it selfe, so is it in the parts of the Universe, where each one may serve as well for the conservation of that which is within it, as the helpe of others without it.

Cusanus de docti. ignor. l. 2. c. 12.

I have now in some measure, shewed that a plurality of worlds does not contradict any principle of reason or place of Scripture, and so cleared the first part of that supposition which is implied in the opinion.

It may next be enquired, whether 'tis possible there may be a globe of elements in that which

we

we call the æthereall parts of the Univerſe; for if this (as it is according to the common opinion) be priviledged from any change or corruption, it will be in vaine then to imagine any element there, and if we will have another world, we muſt then ſeeke out ſome other place for its ſituation. The third Propoſition therefore ſhall be this.

Propoſition. 3.

That the heavens do not conſiſt of any ſuch pure matter which can priviledge them from the like change and corruption, as theſe inferiour bodies are liable unto.

IT hath beene often queſtioned amongſt the ancient Fathers and Philoſophers, what kind of matter that ſhould be ſo, which the heavens are framed, whether or no of any fifth ſubſtance diſtinct from the foure elements, as *Ariſtotle*

ſtotle holds, and with him ſome of the late Schoolemen, whoſe ſubtill braines could not be content to attribute to thoſe vaſt glorious bodies, but common materialls, and therefore they themſelves had rather take paines to preferre them to ſome extraordinary nature, whereas notwithſtanding, all the arguments they could invent, were not able to convince a neceſſity of any ſuch matter, as is confeſt by their owne * ſide. It were much to be deſired, that theſe men had not in other caſes, as well as this, multiplied things without neceſſity, and as if there had not beene enough to be knowne in the ſecrets of nature, have ſpun out new ſubjects from their owne braines to finde more worke for future ages, I ſhall not mention their arguments, ſince 'tis already confeſt, that they are none of them of any neceſſary conſequence, and beſides, you may ſee them ſet downe in any of the bookes, *de Cælo.*

De cælo. li. 1. cap. 2.

* *Colleg. Conimb. de cæl. l. 1. c. 2. q. 6. art. 3.*

But

But it is the generall consent of the Fathers, and the opinion of *Lombard*, that the heavens consist of the same matter with these sublunary bodies. Saint *Ambrose* is confident of it, that hee esteemes the contrary a heresie. True indeede, they differ much among themselves, some thinking them to be made of fire, others of water, but herein they generally agree, that they are all framed of some element or other. For a better confirmation of this, you may see *Ludovicus Molina*, *Eusseb. Nirembergius*, with divers others. The venerable *Bede* thought the Planets to consist of all the foure elements, and 'tis likely that the other parts are of an aereous substance, as will be shewed afterward; however, I cannot now stand to recite the arguments for either, I have onely urged these Authorities to countervaile *Aristotle*, and the Schoolmen, and the better to make way for a proofe of their corruptibility.

In Hexam. lib. 4.

In opere 6. dierum. disput. 5.

In lib. de Mundi constit.

The

The next thing then to be enquired after, is, whether they be of a corruptible nature, not whether they can be deſtroyed by God, for this Scripture puts out of doubt. 2 Pet. 3. 12.

Nor whether or no in a long time they would weare away and grow worſe, for from any ſuch feare they have beene lately priviledged. But whether they are capable of ſuch changes and viciſſitudes, as this inferiour world is liable unto. By Doctor *Hackwel Apol.*

The two chiefe opinions concerning this, have both erred in ſome extremity, the one ſide going ſo farre from the other, that they have both gone beyond the right, whileſt *Ariſtotle* hath oppoſed the truth, as well as the Stoicks.

Some of the Ancients have thought, that the heavenly bodies have ſtood in need of nouriſhment from the elements, by which they were continually feed, and ſo had divers

divers alterations by reason of their food, this is fathered on *Heraclitus*, followed by that great Naturalist *Pliny*, and in generall attributed to all the Stoicks. You may see *Seneca* expressely to this purpose in these words, *Ex illa alimenta omnibus animalibus, omnibus satis, omnibus stellis dividuntur, hinc profertur quo sustineantur tot Sydera tam exercitata, tam avida, per diem, noctemq;, ut in opere, ita in pastu.* Speaking of the earth, he saies, from thence it is, that nourishment is divided to al the living creatures, the Plants and the Starres, hence were sustained so many constellations, so laborious, so greedy both day and night, as well in their feeding as working. Thus also *Lucan* sings,

Necnon Oceano pasci Phœbumq;
polumq; credimus.

Unto these *Ptolome* also that learned Egyptian seemed to agree, when he affirmes that the body of the Moone is moister, and cooler than any of the other Planets, by reason

Plutarch. de plac. philos. l. 2. c. 17.

Nat. Quest. lib. 2. cap. 5.

1°. *Apotel.*

reaſon of the earthly vapours that are exhaled unto it. You ſee theſe ancients thought the Heavens to be ſo farre from this imagined incorruptibility, that rather like the weakeſt bodies they ſtood in need of ſome continuall nouriſhment without which they could not ſubſiſt.

But *Ariſtotle* and his followers were ſo farre from this, that they thought thoſe glorious bodies could not containe within them any ſuch principles, as might make them lyable to the leaſt change or corruption, and their chiefe reaſon was, becauſe we could not in ſo long a ſpace diſcerne any alteration amongſt them: but unto this I anſwere. *De cælo. li. 1. cap. 3.*

1. Suppoſing we could not, yet would it not hence follow that there were none, as hee himſelfe in effect doth confeſſe in another place; for ſpeaking concerning our knowledge of the Heavens, he ſayes 'tis very imperfect and *De Cælo. l. 2. cap. 3.*

difficult, by reason of the vast distance of those bodies from us, and because the changes which may happen unto it, are not either bigge enough or frequent enough to fall within the apprehension and observation of our senses; no wonder then if hee himselfe bee deceived in his assertions concerning these particulars.

2. Though wee could not by our senses see such alterations, yet our reason might perhaps sufficiently convince us of them. Nor can wee well conceive how the Sunne should reflect against the Moone, and yet not produce some alteration of heate. *Diogenes* the Philosopher was thence perswaded that those scorching heates had burnt the Moone into the forme of a Pumice-stone.

3. I answere that there have beene some alterations observed there; witnesse those comets which have been seene above the Moon.

So

So that though *Aristotles* consequence were sufficient, when he proved that the heavens were not corruptible, because there have not any changes beene observed in it, yet this by the same reason must bee as prevalent, that the Heavens are corruptible, because there have beene so many alterations observed there; but of these together with a farther confirmation of this proposition, I shall have occasion to speake afterwards; In the meane space, I will referre the Reader to that worke of *Scheiner* a late Jesuite which he titles his *Rosa Vrsina*, where hee may see this point concerning the corruptibility of the Heavens largely handled and sufficiently confirmed. *lib.4.par.2. cy.24,35.*

There are some other things, on which I might here take an occasion to enlarge my selfe, but because they are directly handled by many others, and doe not immediately belong to the chiefe

matter in hand, I ſhall therefore referre the Reader to their authors, and omit any large proofe of them my ſelfe, as deſiring all poſſible brevity.

1. The firſt is this: That there are no ſolid Orbes. If there be a habitable world in the Moone (which I now affirme) it muſt follow, that her Orbe is not ſolid as *Ariſtotle* ſuppoſed; and if not her, why any of the other. I rather thinke that they are all of a fluid (perhaps aereous) ſubſtance. Saint *Ambroſe*, and Saint *Baſil* did endeavour to prove this out of that place in *Iſay*, where they are compared to ſmoake, as they are both quoted by *Rhodiginus*, *Euſebius*, *Nicrembergius* doth likewiſe from that place confute the ſolidity and incorruptibility of the Heavens, and cites for the ſame interpretation the authority of *Euſtachius* of *Antioch*; and Saint *Auſtin*, I am ſure ſeemes to aſſent unto this opinion, though he does often in

Iſa. 51. 6.

Ant. lect. l. 1. c. 4.

Hiſt. nat. l. 2. c. 11. 13

In lib. ſup. Gen. ad lit.

in his other workes contradict it. The testimony of other Fathers to this purpose you may see in *Sixtus Senensis. l. 5. Biblioth. annot. 14.* but for your better satisfaction herein, I shall referre you to the above named *Scheiner* in his *Rosa Vrsina*, in whom you may see both authorities and reason, and very largely and distinctly set downe for this opinion, for the better confirmation of which he adjoynes also some authenticall Epistles of *Fredericus Cæsius Lynceus* a Noble Prince written to *Bellarmine*, containing divers reasons to the same purpose, you may also see the same truth set downe by *Iohannes Pena* in his preface to *Euclids Opticks*, and *Christoph. Rothmannus*, both who thought the Firmament to bee onely aire: and though the noble *Tycho* doe dispute against them, yet he himselfe holds, *Quod propius ad veritatis penetralia accedit hæc opinio, quam Aristotelica vulgariter ap-*

lib. 4. p. 11. 2 cap. 7. 26, 30.

De stella. 15 72. l. 1. c. 9.

probata, quæ cœlum pluribus realibus atque impervijs orbibus citra rem repleuit. "That this opinion comes "neerer to the truth than that com-"mon one of *Aristotle* which hath "to no purpose filled the Heavens "with such reall and impervious "Orbes.

2. There is no element of fire, which must bee held with this opinion here delivered; for if wee suppose a world in the Moone, then it will follow, that the spheare of fire, either is not there where 'tis usually placed in the concavity of his Orbe, or else that there is no such thing at all, which is most probable since there are not any such solid Orbes, that by their swift motion might heate and enkindle the adjoyning aire, which is imagined to bee the reason of that element. Concerning this see *Cardan*, *Iohannes Pena* that learned Frenchman, the noble *Tycho*, with divers others who have purposely handled this proposition.

3. I might adde a third, *viz.* that there is no Muſicke of the ſpheares, for if they be not ſolid, how can their motion cauſe any ſuch ſound as is conceived? I doe the rather medle with this, becauſe *Plutarch* ſpeakes as if a man might very conveniently heare that harmony, if he were an inhabitant in the Moone. But I gueſſe that hee ſaid this out of incogitancy, and did not well conſider thoſe neceſſary conſequences which depended upon his opinion. However the world would have no great loſſe in being deprived of this Muſicke, unleſſe at ſometimes we had the priviledge to heare it: Then indeed *Philo* the Jew thinks it would ſave us the charges of diet, and we might live at an eaſie rate by feeding at the eare onely, and receiving no other nouriſhment; and for this very reaſon (ſaies hee) was *Moſes* enabled to tarry forty daies and forty nights in the Mount without eating any

De ſomniis.

thing, becauſe he there heard the melody of the Heavens, -*Riſum teneatis*. I know this Muſicke hath had great patrons both ſacred and prophane authors, ſuch as *Ambroſe*, *Bede*, *Boetius*, *Anſelme*, *Plato*, *Cicero* and others, but becauſe it is not now, I thinke affirmed by any, I ſhall not therefore beſtow either paines or time in arguing againſt it.

It may ſuffice that I have onely named theſe three laſt, and for the two more neceſſary, have referred the Reader to others for ſatisfaction. I ſhall in the next place proceed to the nature of the Moones body, to know whether that be capable of any ſuch conditions, as may make it poſſible to be inhabited, and what thoſe qualities are wherein it more neerely agrees with our earth.

Prop. 4.

Propoſition 4.

That the Moone is a ſolid, compacted, opacous body.

I Shall not neede to ſtand long in the proofe of this propoſition, ſince it is a truth already agreed on by the generall conſent of the moſt and the beſt Philoſophers.

1. It is ſolid in oppoſition to fluid, as is the ayer, for how otherwiſe could it beate backe the light which it receives from the Sunne?

But here it may be queſtioned, whether or no the Moone beſtow her light upon us by the reflection of the Sunne-beames from the ſuperficies of her body, or elſe by her owne illumination. Some there are who affirme this latter part. So *Averroes, Celius Rhodiginus, Iulius Cæſar, &c.* and their reaſon

De Cœlo l.2. com.49. Antiction. l.20. c.4. de phænom. lunæ. c.11.

reason is because this light is discerned in many places, whereas those bodies which give light by reflexion can there onely be perceived where the angle of reflexion is equall to the angle of incidence, and this is onely in one place, as in a looking-glasse those beames which are reflected from it cannot bee perceived in every place where you may see the glasse, but onely there where your eye is placed on the same line whereon the beames are reflected.

But to this I answere, that the argument will not hold of such bodies, whose superficies is full of unequall parts and gibbosities as the Moone is. Wherefore it is as well the more probable as the more common opinion, that her light proceedes from both these causes, from reflexion and illumination; nor doth it herein differ from our earth since that also hath some light by illumination: for how

how otherwise would the parts about us in a Sunne-shine day appeare so bright, when as all the rayes of reflexion cannot enter into our eye?

2. It is compact, and not a spungie and porous substance. But this is denied by *Diogenes*, *Vitellio*, and *Reinoldus*, and some others, who held the Moone to be of the same kind of nature as a Pumice stone, and this, say they, is the reason why in the Sunnes eclipses there appeares within her a duskish muddy colour, because the Sun beames being refracted in passing through the pores of her body, must necessarily be represented under such a colour.

Plut. de placphil. l. 2. c. 13. Opt. lib. 4. Com. Purbac. Theo. p. 164.

But I reply, if this be the cause of her redneſſe, then why doth she not appeare under the same forme when she is about a sextile aspect, and the darkned part of her body is discernable? for then also doe the same rayes passe through her, and therefore in all likelihood should

should produce the same effect, and notwithstanding those beames are then diverted from us, that they cannot enter into our eyes by a streight line, yet must the colour still remaine visible in her body, and besides according to this opinion, the spots would not alwaies be the same, but divers as the various distance of the Sunne requires.

Scaliger exercit. 80. § 13. Againe, if the Sunne beames did passe through her, why then hath she not a taile as the Comets? why doth she appeare in such an exact round? and not rather attended with a long flame, sicne it is meerly this penetration of the Sunne beames that is usually attributed to be the cause of beards in blazing starres.

Plut. de facie lunæ. 3. It is opacous, not transparent or diaphanous like Chrystall or glasse, as *Empedocles* thought, who held the Moone to be a globe of pure congealed aire, like haile inclosed in a spheare of fire, for then,

1. Why

1. Why does shee not alwaies appeare in the full? since the light is dispersed through all her body?

2. How can the interposition of her body so darken the Sunne, or cause such great eclipses as have turned day into night, that have discovered the stars, and frighted the birds with such a sudden darkenesse, that they fell downe upon the earth, as it is related in divers Histories. And therefore *Herodotus* tellin of an eclipse which fell in *Xerxes* time, describes it thus: ὁ ἥλιος ἐκλιπὼν τὴν ἐν τῷ οὐρανῷ ἕδρην ἠφανίσθη. The Sunne leaving his wonted seat in the heavens, vanished away: all which argues such a great darkenesse, as could not have beene, if her body had beene perspicuous. Yet some there are who interpret all these relations to be hyperbolicall expressions, and the noble *Tycho* thinkes it naturally impossible, that any eclipse should cause such darkenesse, because

Thucid. Livii. Plut. de facie Lunæ.

Herodot. l. 7. c. 37.

cause the body of the Moone can never totally cover the Sunne; however, in this he is singular, all other Astronomers (if I may believe *Keplar*) being on the contrary opinion, by reason the Diameter of the Moone does for the most part appeare bigger to us then the Diameter of the Sunne.

De phænom. Lunæ. c. 11.

But here *Julius Cæsar* once more, puts in to hinder our passage. The Moone (saith he) is not altogether opacous, because 'tis still of the same nature with the heavens, which are incapable of totall opacity: and his reason is, because perspicuity is an inseparable accident of those purer bodies, and this hee thinkes must necessarily be granted, for he stops there, and proves no further; but to this I shall deferre an answer, till hee hath made up his argument.

We may frequently see, that her body does so eclipse the Sunne, as our earth doth the Moone; since then

then the like interposition of them both, doth produce the like effect, they must necessarily be of the like natures, that is alike opacous, which is the thing to be shewed; and this was the reason (as the Interpreters guesse) why *Aristotle* affirmed the Moone to be of the earths nature, because of their agreement in opacity, whereas all the other elements save that, are in some measure perspicuous. *In lib. de animalib.*

But the greatest difference which may seeme to make our earth altogether unlike the Moon, is, because the one is a bright body, and hath light of its owne, and the other a grosse darke body which cannot shine at all. 'Tis requisite therefore, that in the next place I cleare this doubt, and shew that the Moone hath no more light of her owne than our earth.

Proposition

Proposition. 5.

That the Moone hath not any light of her owne.

Toſtatus in 1. Gen. Hieron. de 5. Hide. Hebreoma l. 2. c. 4.

'Twas the fancy of ſome of the Jewes, and more eſpecially of *Rabbi Simeon*, that the Moone was nothing elſe but a contracted Sunne, and that both thoſe planets at their firſt creation were equall both in light and quantity, for becauſe God did then call them both great lights, therefore they inferred, that they muſt be both equall in bigneſſe. But a while after (as the tradition goes) the ambitious Moone put up her complaint to God againſt the Sun, ſhewing, that it was not fit there ſhould be two ſuch great lights in the heavens, a Monarchie would beſt become the place of order and harmony. Upon this, God commanded her to contract her ſelfe into a narrower compaſſe, but ſhee being much

much discontented hereat, replies, What! because I have spoken that which is reason and equity, must I therefore be diminished? This sentence could not chuse but much trouble her; and for this reason was shee in much distresse and griefe for a long space, but that her sorrow might be some way pacified, God bid her be of good cheere, because her priviledges and charter should be greater then the Suns, he should appeare in the day time onely, shee both in the day and night, but her melancholy being not satisfied with this, shee replied againe, that that alas was no benefit, for in the day time she should be either not seene, or not noted. Wherefore, God to comfort her up, promised, that his people the Israelites should celebrate all their festivall and holy daies by a computation of her moneths, but this being not able to content her, shee has looked very melancholy ever since; howe-

ver ſhee hath ſtill reſerved much light of her owne.

Others there were, that did thinke the Moone to be a round globe, the one halfe of whoſe body was of a bright ſubſtance, the other halfe being darke, and the divers converſions of thoſe ſides towards our eyes, cauſed the variety of her appearances: of this opinion was *Beroſus*, as he is cited by *Vitruvius*, and S^t. *Auſtin* thought it was probable enough, but this fancy is almoſt equally abſurd with the former, and both of them ſound rather like fables, then philoſophicall truths. You may commonly ſee how this latter does contradict frequent and eaſie experience, for 'tis obſerved, that that ſpot which is perceived about her middle, when ſhee is in the increaſe, may be diſcern'd in the ſame place when ſhe is in the full: whence it muſt follow, that the ſame part which was before darkned, is after inlightened, and that the one part

Lib. 9. Architecturæ in enarrat. Pſalmorum.

is not alwaies darke and the other light of it ſelfe, but enough of this, I would be loth to make an enemy, that I may afterwards overcome him, or beſtow time in proving that, which is already granted, I ſuppoſe now, that neither of them hath any patrons, and therfore need no confutation.

Tis agreed upon by all ſides, that this Planet receives moſt of her light from the Sunne, but the chiefe controverſie is, whether or no ſhe hath any of her owne? The greater multitude affirme this. *Cardan* amongſt the reſt, is very confident of it, and he thinks that if any of us were in the Moone at the time of her greateſt eclipſe, *Lunam aſpiceremus non ſecus ac innumeris cereis ſplendidiſſimis accenſis, atq; in eas oculis defixis* "*caecutiremus*; wee ſhould perceive ſo great a brightneſſe of "her owne, that would blind us with the meere ſight, and when ſhee is enlightened by the Sunne, *De Subtil. lib.* 3.

then no eagles eye if there were any there, is able to looke upon her. This *Cardan* saies, and hee doth but say it without bringing any proofe for its confirmation. However I will set downe the arguments that are usually urged for this opinion, and they are taken either from Scripture or reason; from Scripture is urged that place, 1 *Cor.* 15. where it is said, *There is one glory of the Sunne, and another glory of the Moone. Vlysses Albergettus* urges that in *Math.* 24.29. ἡ σελήνη οὐ δώσει τὸ φέγγος αὐτῆς, *The Moone shall not give her light*: therefore (sayes he) she hath some of her owne.

But to these we may easily answere that the glory and light there spoken off, may be said to bee hers though it bee derived, as you may see in many other instances.

The arguments from reason are taken either

1. From that light which is dif-

discerned in her, when there is a totall eclipse of her owne body, or of the Sunne.

2. From the light which is discerned in the darker part of her body, when she is but a little distant from the Sunne.

1. For when there are any totall eclipses, there appeares in her body a great redneſſe, and many times light enough to cause a remarkeable shade, as common experience doth sufficiently manifest: but this cannot come from the Sunne, since at such times either the earth or her owne body shades her from the Sunne-beames, therefore it must proceede from her owne light.

2. Two or three daies after the new Moone, wee may perceive light in her whole body, whereas the rayes of the Sun reflect but upon a small part of that which is visible, therefore 'tis likely that there is some light of her owne.

In answering to these objecti-

ons, I shall first shew, that this light cannot be her owne, and then declare that which is the true reason of it.

That it is not her owne, appeares

1. From the variety of it at divers times; for 'tis commonly observed that sometimes 'tis of a brighter, sometimes of a darker appearance, now redder and at another time of a more duskish colour. The observation of this variety in divers eclipses, you may see set downe by *Keplar* and many others, but now this could not be if that light were her owne, that being constantly the same, and without any reason of such an alteration: So that thus I may argue.

Opt. Astron. c. 7. num. 3.

If there were any light proper to the Moone, then would that Planet appeare brightest when she is eclipsed in her Perige being neerest to the earth, and so consequently more obscure and duskish when she is in her Apoge or farthest

theſt from it; the reaſon is, becauſe the nderer any enlightned body comes to the ſight, by ſo much the more ſtrong are the ſpecies and the better perceived. This ſequell is granted by ſome of our adverſaries, and they are the very words of noble *Tycho*, *Si luna genuino gauderet lumine, atq; cum in umbra terræ eſſet, illud non amitteret, ſed eò evidentius exereret, omne enim lumen in tenebris, plus ſplendet cum alio majore fulgore non præpediur.* If the Moone had any light of her owne, then would ſhe not loſe it in the earths ſhadow, but rather ſhine more clearely, ſince every light appeares greater in the darke, when it is not hindered by a more perſpicuous brightneſſe.

De nova ſtella. lib. 1. c. 10.

But now the event fals out cleane contrary, (as obſervation doth manifeſt, and our oppoſites themſelves doe grant) the Moone appearing with a more reddiſh and cleare light when ſhe is eclip-

Reinhold *comment. in Purb. Theor. pag. 164.*

sed being in her Apoge or farthest distance, and a more blackish yron colour when shee is in her Perige or neerest to us, therefore shee hath not any light of her owne. Nor may we thinke that the earths shadow can cloud the proper light of the Moone from appearing, or take away any thing from her inherent brightnesse, for this were to thinke a shadow to be a body, an opinion altogether mis-becomming a Philosopher, as *Tycho* grants in the fore-cited place, *Nec umbra terræ corporeum quid est, aut densa aliqua substantia, aut lunæ lumen obtenebrare possit, atq; id visui nostro præripere, sed est quædam privatio luminis solaris, ob interpositum opacum corpus terræ.* Nor is the earths shadow any corporall thing, or thicke substance, that it can cloud the Moones brightnesse or take it away from our sight, but it is a meere privation of the Sunnes light by reason of the interposition of the earths opacous body. 2. If

2. If she had any light of her owne then that would in it selfe be, either such a ruddy brightnesse as appeares in the eclipses, or else such a leaden duskish light as wee see in the darker parts of her body, when she is a little past the conjunction. (That it must be one of these may follow from the opposite arguments) but it is neither of these, therefore she hath none of her owne.

1. 'Tis not such a ruddy light as appeares in eclipses, for then why can we not see the like rednesse, when we may discerne the obscurer parts of the Moone?

You will say, perhaps, that then the neerenesse of that greater light takes away that appearance.

I reply, this cannot be, for then why does Mars shine with his wonted rednesse, when he is neere the Moone? or why cannot her greater brightnesse make him appeare white as the other Planets?

nor

nor can there be any reason given why that greater light should represent her body under a false colour.

2. 'Tis not such a duskish leaden light, as we see in the darker part of her body, when shee is about a sextile Aspect distant from the Sunne, for then why does she appeare red in the eclipses, since the more shade cannot choose such variety, for 'tis the nature of darkness by its opposition, rather to make things appeare of a more white and cleare brightnesse than they are in themselves, or if it be the shade, yet those parts of the Moone are then in the shade of her body, and therefore in reason should have the like redness. Since then neither of these lights are hers, it followes that she hath none of her owne. Nor is this a singular opinion, but it hath had many learned patrons, such was *Macrobius*, who being for this quoted of *Rhodiginus*, he cals him

Somn. Scip. l.1.c.20.

vir

vir re conditissimæ scientiæ, a man who knew more then ordinary Philosophers, thus commending the opinion in the credit of the Authour. To him assents the Venerable *Bede*, upon whom the glosse hath this comparison. As the Looking-glasse represents not any image within it selfe unlesse it receive some from without, so the Moone hath not any light, but what is bestowed by the Sun. To these agreed *Albertus Magnus*, *Scaliger*, *Mæstin*, and more especially *Mulapertius*, whose words are more pat to the purpose then others, and therefore I shall set them downe as you may finde them in his preface to his Treatise concerning the *Australes sydera*; *Luna*, *Venus*, & *Mercurius*, *terrestris & humidæ sunt substantiæ*, *ideoq; de suo non lucere*, *sicuti nec terra*. The Moone, *Venus*, and *Mercurie* (saith he) are of an earthly and moyst substance, and therefore have no more light of their

Lect. antiq. l. 1. c. 15.

In lib. de naturarum

De 4r. Cœlii. Q. 4ª. Art. 21. Exercit. 62. 1. Epitom. Astron. l. 4. p. 2.

their owne, then the earth hath. Nay some there are who thinke that all the other Starres doe receive that light, whereby they appeare visible to us from the Sunne, so *Ptolomie*, *Isidore Hispalensis*, *Albertus Magnus*, and *Bede*, much more then must the Moone shine with a borrowed light.

Originum l.3. c.60. De Coelo l.2. De ratione temper. c.4.

But enough of this. I have now sufficiently shewed what at the first I promised, that this light is not proper to the Moone. It remaines in the next place, that I tell you the true reason of it. And here, I thinke 'tis probable that the light which appeares in the Moone at the eclipses is nothing else but the second species of the Sunnes rayes which passe through the shadow unto her body: and from a mixture of this second light with the shadow, arises that redneſſe which at such times appeares unto us. I may call it *Lumen crepuſculum*, the *Aurora* of the

the Moone, or ſuch a kinde of bluſhing light, that the Sunne cauſes when he is neere his riſing, when he beſtowes ſome ſmall light upon the thicker vapours. Thus wee ſee commonly the Sunne being in the Horizon, and the reflexion growing weake, how his beames make the waters appeare very red.

The Moabites in *Iehorams* time when they roſe early in the morning, and beheld the waters a farre off, miſtooke them for blood. *Et cauſa hujus eſt quia radius ſolaris in Aurora contrahit quandam rubedinem, propter vapores combuſtos manentes circa ſuperficiem terræ, per quos radii tranſeunt, & ideo cum repercutiantur in aqua ad oculos noſtros, trahunt ſecum eundem ruborem, & faciunt apparere locum aquarum, in quo eſt repercuſſio eſſe rubrum* ſaith *Toſtatus*. The reaſon is, becauſe of his rayes, which being in the lower vapours, thoſe doe convey an imperfect mixed light

2 King. 3. 22.

2^a. *Quæſt. in hoc cap.*

light upon the waters. Thus the Moon being in the earths shadow, and the Sunne beames which are round about it, not being able to come directly unto her body, yet some second raies there are, which passing through the shadow, make her appeare in that ruddy colour: So that she must appeare brightest, when shee is eclipsed, being in her Apoge or greatest distance from us, because then the cone of the earths shadow is lesse, and the refraction is made through a narrower medium. So on the contrary, she must be represented under a more darke and obscure forme when she is eclipsed, being in her Perige, or neerest to the earth, because then she is involved in a greater shadow, or bigger part of the cone, and so the refraction passing through a greater medium, the light must needs be weaker which doth proceed from it. If you aske now what the reason may be of that light which we discerne

discerne in the darker part of the new Moone. I answer, 'tis reflected from our earth which returnes as great a brightnesse to that Planet, as it receives from it. This I shall have occasion to prove afterward.

I have now done with these propositions which were set downe to cleare the passage, and confirme the suppositions implied in the opinion, I shall in the next place proceed to a more direct treating of the chiefe matter in hand.

Proposition 6.

That there is a world in the Moone, hath beene the direct opinion of many ancient, with some moderne Mathematicians, and may probably be deduced from the tenents of others.

SInce this opinion may be suspected of singularity, I shall there-

therefore first confirme it by sufficient authority of divers authours, both ancient and moderne, that so I may the better cleare it from the prejudice either of an upstart fancy, or an obsolete errour. This is by some attributed to *Orpheus*, one of the most ancient Greeke Poets, who speaking of the Moone, saies thus, ἡ πολλ' ὄρεα ἔχει, πολλ' ἄστεα, πολλα μέλαθρα, That it hath many mountaines and cities, and houses in it. To him assented *Xenophanes*, *Anaxagoras*, *Democritus*, and *Heraclitus*, all who thought it to have firme solid ground, like to our earth, containing in it many large fields, champion grounds, and divers inhabitants, unto these agreed *Pythagoras*, who thought that our earth was but one of the Planets which moved round about the Sunne, (as *Aristotle* relates it of him) and the *Pythagoreans* in generall did affirme, that the Moone also was terrestriall, that she was inhabited

Plut. de plac. phil. l. 2. c. 13

Ibid. c. 25.

Diog. Laert. l. 2. & l. 9.

De Cœlo. l. 2. cap. 13.

as

as this lower world. That those living creatures & plants which are in her, exceed any of the like kind with us in the same proportion, as their daies are longer than ours: *viz.* by 15. times. This *Pythagoras* was esteemed by all, of a most divine wit, as appeares especially by his valuation amongst the *Romans*, who being cõmanded by the Oracle to erect a statue to the wisest *Grecian*, the Senate determined *Pythagoras* to be meant, preferring him in their judgements before the divine *Socrates*, whom their Gods pronounc'd the wisest. Some think him a *Jew* by birth, but most agree that hee was much conversant amongst the learneder sort, and Priests of that Nation, by whom he was informed of many secrets, and perhaps, this opinion, wch he vented afterwards in *Greece*, where he was much opposed by *Aristotle* in some worded disputations, but never confuted by any solid reason.

Plut. ibid. cap. 30.

Plin. Nat. Hist. l 34. cap. 6.

To this opinion of *Pythagoras*

did *Plato* also assent, when hee considered that there was the like eclipse made by the earth, and this, that it had no light of its owne, that it was so full of spots. And therefore wee may often reade in him and his followers, of an *aethereo terra*, and *lunares populi*, an æthereall earth, and inhabiters in the Moone; but afterwards this was mixed with many ridiculous fancies: for some of them considering the mysteries implied in the number 3. concluded that there must necessarily be a Trinity of worlds, whereof the first is this of ours, the second in the Moone whose element of water is represented by the spheare of *Mercury*, the aire by *Venus*, and the fire by the Sunne. And that the whole Universe might the better end in earth as it began, they have contrived it, that *Mars* shall be a spheare of the fire, *Jupiter* of aire, *Saturne* of water; and above all these, the Elysian fields, spacious and

Plat. de conviviis. Macrob. Somn. Scip. lib. 1. c. 11.

and pleasant places appointed for the habitation of those unspotted soules, that either never were imprisoned in, or else now have freed themselves from any commerce with the body. *Scaliger* speaking of this *Platonick* fancie, *quæ inter res crientes mundum quasi assem divisit*, thinks 'tis confutation enough, to say, 'tis *Plato's*. However for the first part of this assertion, it was assented unto by many others, and by reason of the grossenesse and inequality of this planet, 'twas frequently called *quasi terra cœlestis*, as being esteemed the sediment and more imperfect part of those purer bodies, you may see this proved by *Plutarch*, in that delightfull work which he properly made for the confirmation of this particular. With him agreed *Alcinous* and *Plotinus*, later Writers. Unto these I might also adde the imperfect testimony of *Mahomet*, whose authority of grant can adde but little credit to this opinion,

Exercit. 62.

De facie Lunæ.

Institut. ad discip. Plat. Cœl. Rhodig. l. 1. c. 4.

because hee was an ignorant imposter, but yet consider that originall, from whence hee derived most of his knowledge, and then, perhaps, his witnesse may carry with it some probability. Hee is commonly thought by birth to be an Ismaelite, being instructed by the Jewes in the secrets of their philosophy and, perhaps, learned this from those Rabbies, for in his *Alcaron*, hee talkes much of mountaines, pleasant fields, and cleare rivers in the heavens, but because he was for the maine very unlearned, hee was not able to deliver any thing so distinctly as he was informed. The Cardinall *Cusanus* and *Iornandus Brunus*, held a particular world in every Starre, and therefore one of them defining our earth, he saies, it is *stella quædam nobilis, quæ lunam & calorem & influentiam habet aliam, & diversam ab omnibus aliis stellis*; a "noble starre having a distinct "light, heat and influence from all "the

Azoara. 57. & 65.

Cusa. de docti. ign. l. 2. cap. 12.

"the reſt. Unto this *Nichol. Hill*, a country man of ours was inclined, when hee ſaid *Aſtrea terræ natura probabilis eſt*: "That 'tis probable "the earth hath a ſtarry nature.

Philoſ. epicur. part. 434.

But the opinion which I have here delivered was more directly proved by *Maſtin Keplar*, and *Galilæus*, each of them late writers, and famous men for their ſingular skill in Aſtronomy. As for thoſe workes of *Maſtin* and *Keplar* wherein they doe more expreſly treate of this opinion, I have not yet had the happineſſe to ſee them. However their opinions appeare plaine enough from their owne writings, and the teſtimony of others concerning them. But *Julius Cæſar*, whom I have above quoted, ſpeaking of their teſtimony whom I now cite for this opinion, *viz.* *Keplar* and *Galilæus* affirmes that to his knowledge they did but jeſt in thoſe things which they write concerning this, and as for any ſuch world, he aſſu-

In Theſibus diſſertatio cum Nic. Hill. Nuncius Sydereus.

De phænom. lunæ. c. 4.

redly knowes they never so much as dreamt of it. But I had rather believe their owne words, then his pretended knowledge.

'Tis true indeed, in many things they doe but trifle, but for the maine scope of those discourses, 'tis as manifest they seriously meant it, as any indifferent Reader may easily discerne; otherwise sure *Campanella* (a man as well acquainted with his opinion, and perhaps his person as *Cæsar* was) would never have writ an apologie for him. And besides 'tis very likely if it had beene but a jest, *Galileus* would never have suffered so much for it as afterwards he did. But as for the knowledge which hee pretends, you may guesse what it was by his confidence (I say not presumption) in other assertions, and his boldnesse in them may well derogate from his credit in this. For speaking of *Ptolome's Hypotheses* he pronounces this verdict, *Impossibile est excen-*

Cap. 7.

centricorum & epicyclorum positio, nec aliquus est ex Mathematicis adeo stultis qui veram illam existimet. "The position of *Excen-*
"*tricks* and *Epicycles* is altogether
"impossible, nor is there any
"Mathematician such a foole as
"to thinke it true. I should guesse
hee could not have knowledge
enough to maintaine any other
Hypothesis who was so ignorant
in Mathematickes, as to deny that
any good Author held this. For I
would faine know whether there
were never any that thought the
Heavens to be solid bodies, and
that there were such kindes of
motion as is by those feined Orbes
supplied; if so, then *Cæsar la*
Calla was much mistaken. I thinke
his assertions are equally true, that
Galileus and *Kepler* did not hold
this, and that there were none
which ever held that other.

But in my following discourse
I shall most insist on the obser-
vation of *Galilæus*, the inventor of

that famous perspective, whereby we may discerne the Heavens hard by us, whereby those things which others have formerly guest at are manifested to the eye, and plainely discovered beyond exception or doubt, of which admirable invention, these latter ages of the world may justly boast, and for this expect to be celebrated by posterity. Tis related of *Eudoxus*, that hee wished himselfe burnt with *Phaeton*, so he might stand over the Sunne to contemplate its nature; had hee lived in these daies, hee might have enjoyed his wish at an easier rate, and scaling the heavens by this glasse, might plainely have discerned what hee so much desired. *Keplar* considering those strange discoveries which this perspective had made, could not choose but cry out in a ἐκστατικὴ and rapture of admiration. *O multiscium & quovis sceptro pretiosius perspicillum! an qui te dextra tenet, ille non dominus con-*

constituatur operum Dei? And *Iohannes Fabricius* an elegant writer, speaking of the same glasse, and for this invention preferring our age before those former times of greater ignorance, sayes thus; *Adeo sumus superiores veteribus, ut quam illi carminis magici pronunciatu de missam repræsentare posse putantur nos non tantum innocenter demittamus, sed etiam familiari quodam intuitu ejus quasi conditionem intueamur.* "So much are wee "above the ancients, that whereas "they were faine by their magi "call charmes to represent the "Moones approach, wee cannot "onely bring her lower with a "greater innocence, but may also "with a more familiar view be-"hold her condition. And because you shall have no occasion to questiō the truth of those experiments, which I shall afterwards urge from it; I will therefore set downe the testimony of an enemy, and such a witnesse hath alwaies beene accounted

De macula in sole obser.

counted prevalent: you may see it in the abovenamed *Cæsar la Galla*, whose words are these: *Mercurium caduceum gestantem, cœlestia nunciare, & mortuorum animas ab inferis revocare sapiens finxit antiquitas. Galileum verò novum Jovis interpretem Telescopio caduceo instructum Sydera aperire, & veterum Philosophorum manes ad superos revocare soleis nostra etas videt & admiratur.* Wise antiquity fabled *Mercury* carrying a rodde in his hand to relate newes from Heaven, and call backe the soules of the dead, but it hath been the happinesse of our industrious age to see and admire *Galileus* the new Embassadour of the Gods furnished with his perspective to unfold the nature of the Starres, and awaken the ghosts of the ancient Philosophers. So worthily and highly did these men esteeme of this excellent invention.

De phænom. cap. 1.

Now if you would know what might

might bee done by this glasse, in the sight of such things as were neerest at hand, the same Authour will tell you, when he sayes, that by it those things which could scarce at all bee discerned by the eye at the distance of a mile and a halfe, might plainely and distinctly be perceived for 16 *Italian* miles, and that as they were really in themselves, without any transposition or falsifying at all. So that what the ancient Poets were faine to put in a fable, our more happy age hath found out in a truth, and we may discerne as farre with these eyes which *Galileus* hath bestowed upon us, as *Lynceus* could with those which the Poets attributed unto him. But if you yet doubt whether all these observations were true, the same Author may confirme you, when he sayes they were shewed, *Non uni aut alteri, sed quamplurimis, neq; gregariis hominibus, sed præcipuis atq; disciplinis omnibus,* nec

ibid. c. 5.

Cap. 1.

necnon Mathematicis & opticis præceptis, optimè instructis sedulâ ac diligenti inspectione. "Not "to one or two, but to very many, "and those not ordinary men, but "to those who were well vers'd "in Mathematickes and Opticks, "and that not with a meere glance, "but with a sedulous and dili-"gent inspection. And least any scruple might remaine unanswered, or you might thinke the men who beheld all this though they might be skilfull, yet they came with credulous minds, and so were more easie to be deluded. Hee addes that it was shewed, *vires quid ad experimenta hæc contradicendi animo accesserant.* "To such as "were come with a great deale of "prejudice, and an intent of con-"tradiction. Thus you may see the certainety of those experiments which were taken by this glasse. I have spoken the more concerning it, because I shall borrow many things in my farther discourse;

Cap. 5.

discourse, from those discoveries which were made by it.

I have now cited such Authors both ancient and moderne, who have directly maintained the same opinion. I told you likewise in the proposition that it might probably be deduced from the tenents of others: such were *Aristarchus*, *Philolaus* and *Copernicus*, with many other later writers who assented to their hypothesis, so *Ioach. Rhelicus*, *David Origanus Lansbergius*, *Guil. Gilbert*, and (if I may believe *Campanella*) *Innumeri alii Angli & Galli.* Very many others, both English and French, all who affirmed our Earth to bee one of the Planets, and the Sunne to be the Centre of all, about which the heavenly bodies did move, and how horid soever this may seeme at the first, yet is it likely enough to be true, nor is there any maxime or observation in Opticks (saith *Pena*) that can disprove it.

Apologia pro Galileo.

Now

Now if our earth were one of the Planets (as it is according to them) then why may not another of the Planets be an earth?

Thus have *I* shewed you the truth of this proposition: Before *I* proceede farther, 'tis requisite that *I* informe the Reader, what method *I* shall follow in the proving of this chiefe assertion, that there is a World in the *Moone*.

The order by which *I* shall be guided will be that which *Aristotle* uses in his booke *De mundo* (if that booke were his.)

à 1°. cap. ad 10m.

First, περὶ τῶν ἐν αὐτῷ of those chiefe parts which are in it; next the elementary and ætherealL (as he doth there) since this doth not belong to the elementary controversie, but of the Sea and Land, &c. Secondly, περὶ αὐτῷ παθῶν, of those things which are extrinsecall to it, as the seasons, meteors and inhabitants.

Prop. 7.

Proposition 7.

That those spots and brighter parts which by our sight may bee distinguished in the Moone, doe shew the difference betwixt the Sea and Land in that other World.

FOr the cleare proofe of this proposition, I shall first reckon up and refute the opinions of others concerning the matter and forme of those spots, and then shew the greater probability of this present assertion, and how agreeable it is to that truth, which is most commonly received; as for the opinions of other concerning these, they have beene very many, I will only reckon up those which are common and remarkable.

Some there are that thinke those spots doe not arise from any deformity

formity of the parts, but a deceit of the eye, which cannot at such a distance discerne an equall light in that planet, but these doe but onely say it, and shew not any reason for the proofe of their opinion: Others thinke that there are some bodies betwixt the Sunne and Moone, which keeping off the lights in some parts, doe by their shadow produce these spots which we there discerne.

So *Bede* in *3. de Mund. constit.*

Others would have them to be the figure of the mountaines here below represented there as in a looking-glasse. But none of those fancies can be true, because the spots are still the same, and not varied according to the difference of places, and besides, *Cardan* thinks it is impossible that any image should be conveyed so farre as there to be represented unto us at such a distance, but tis commonly related of *Pythagoras*, that he by writing, what he pleased in a glasse, by the reflexiō of the same species, would

De subtil. lib. 3.

make

make those letters to appeare in the circle of the Moone, where they should be legible by any other, who might at that time be some miles distant from him. * *Agrippa* affirmes this to be possible, and the way of performing it not unknowne to himselfe, with some others in his time. It may be that our Bishop did by the like meanes performe those strange conclusions which hee professes in his *Nuncius inanimatus*, where hee pretends that hee can informe his friends of what he pleases, though they be an hundred miles distant, *forte etiam, vel miliare millesimum*, they are his owne words, and, perhaps, a thousand, and all this in a minutes space, or little more, quicker than the Sunne can move.

* *Occulta ad Philos. l. 1. cap. 6.*

Now, what conveyance there should be for so speedy a passage, I cannot conceive, unlesse it be carried with the light, then which wee know not any thing quicker; but of this onely by the way;

however, whether those images can be represented so or not, yet certaine it is, those spots are not such representations. Some thinke that when God had at first created too much earth to make a perfect globe, not knowing well where to bestow the rest, he placed it in the Moone, which ever since hath so darkened it in some parts, but the impiety of this is sufficient confutation, since it so much detracts from the divine power and wisedome.

* *Plut. de placit. phil. l. 2. c. 25.*

The * Stoicks held that Planet to be mixed of fire and aire, and in their opinion, the variety of its composition, caused her spots: *Anaxagoras* thought all the starres to be of an earthly nature, mixed with some fire, and as for the Sunne, he affirmed it to be nothing else but a fiery stone; for which later opinion, the *Athenians* sentenc'd him to death; those zealous Idolaters counting it a great blasphemy, to make their God

Josephus l. 2. con. App. Augus. de Civit. Dei. l. 18. c. 41.

God a ſtone, whereas notwithſtanding, they were ſo ſenſleſſe in their adoration of Idols, as to make a ſtone their God, this *Anaxagoras* affirmed the Moone to be more terreſtriall then the other, but of a greater purity then any thing here below, and the ſpots hee thought were nothing elſe, but ſome cloudy parts, intermingled with the light which belonged to that Planet, but I have above deſtroyed the ſuppoſition on which this fancy is grounded: *Pliny* thinkes they ariſe from ſome droſſe fluffe, mixed with that moyſture which the Moone attracts unto her ſelfe, but hee was of their opinion who thought the ſtarres were nouriſhed by ſome earthly vapours, which you may commonly ſee refuted in the *Commentators* on the bookes, *de Cœlo*.

Nat. Hiſt. l. 2. c. 9.

Vitellio and *Reinoldus* affirme the ſpots to be the thicker parts of the Moone, into which the Sunne cannot infuſe much light,

Opt. lib. 9. comment. in Purb. pag. 164.

and this (ſay they) is the reaſon, why in the Sunnes eclipſes, the ſpots and brighter parts are ſtill in ſome meaſure diſtinguiſhed, becauſe the Sunne beames are not able ſo well to penetrate through thoſe thicker, as they may through the thinner parts of that Planet. Of this opinion alſo was *Gaſar la Galla*, whoſe words are theſe, "The Moone doth there appeare "cleareſt, where ſhee is tranſpi-"cuous, not onely through the "ſuperficies, but the ſubſtance "alſo, and there ſhe ſeemes ſpot-"ted, where her body is moſt "opacous. The ground of this his aſſertion was, becauſe hee thought the Moone did receive and beſtow her light by illumination onely, and not at all by reflexion, but this, together with the ſuppoſed penetration of the Sunne beames, and the perſpicuity of the Moones body I have above anſwered and refuted.

Ex qua parte luna eſt tranſpicua non ſolum ſecundum ſuperficiem, ſed etiam ſecundum ſubſtantiam, eatenus clara, ex qua autem parte opaca eſt, eatenus obſcura videtur. De Phænom. cap. 11.

The

The more common and generall opinion is, that the ſpots are the thinner parts of the Moone, which are leſſe able to reflect the beames that they receive from the Sunne, and this is moſt agreeable to reaſon; for if the ſtarres are therefore brighteſt, becauſe they are thicker and more ſolid then their orbes, then it will follow, that thoſe parts of the Moone which have leſſe light, have alſo leſſe thickeneſſe. It was the providence of nature (ſay ſome) that ſo contrived that planet to have theſe ſpots within it, for ſince that is neereſt to thoſe lower bodies which are ſo full of deformity, 'tis requiſite that it ſhould in ſome meaſure agree with them, and as in this inferiour world the higher bodies are the moſt compleat, ſo alſo in the heavens perfection is aſcended unto by degrees, and the Moone being the loweſt, muſt be the leaſt pure, and therefore *Philo* the Jew interpreting

Albert. mag. de Cœvis. Q. 4. Art. 21. Colleg. Con.

De Somniis.

ting *Iacobs* dreame concerning the ladder, doth in an allegory shew, how that in the fabricke of the world, all things grow perfecter as they grow higher, and this is the reason (saith hee) why the Moone doth not consist of any pure simple matter, but is mixed with aire, which shewes so darkely within her body.

But this cannot be a sufficient reason, for though it were true that nature did frame every thing perfecter as it was higher, yet is it as true that nature frames every thing fully perfect for that office to which shee intends it. Now, had shee intended the Moone meerly to reflect the Sunne beames and give light, the spots then had not so much argued her providence, as her unskilfulnesse and imperfection, as if in the haste of her worke shee could not tell how to make that body exactly fit, for that office to which she appointed it.

Scalig. exercit. 62.

It is likely then that she had some other

other end which moved her to produce this variety, and this in all probability was her intent to make it a fit body for habitation with the ſame conveniences of ſea and land, as this inferiour world doth partake of. For ſince the Moone is ſuch a vaſt, ſuch a ſolid and opacous body like our earth (as was above proved) why may it not be probable, that thoſe thinner and thicker parts appearing in her doe ſhew the difference betwixt the ſea and land in that other world; and *Galileus* doubts not, but that if our earth were viſible at the ſame diſtance, there would be the like appearance of it.

As for the forme of thoſe ſpots, ſome of the vulgar thinke they repreſent a man, and the Poets gueſſe tis the boy *Endimion*, whoſe company ſhe loves ſo well, that ſhee carries him with her, others will have it onely to be the face of a man as the Moone is uſually pictured, but *Albertus* thinkes rather,

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that it represents a Lyon with his taile towards the East, and his head the West, and * some others have thought it to be very much like a Fox, & certainly 'tis, as much like a Lyon as that in the *Zodiake*, or as *Ursa major* is like a Beare.

* *Euschius Noremb. Hist. Nat. lib. 8. c. 15.*

I should guesse that it represents one of these as well as another, and any thing else as well as any of these, since 'tis but a strong imagination, which fancies such images as schoole-boyes usually do in the markes of a wall, whereas there is not any such similitude in the spots themselves, which rather like our Sea, in respect of the land, appeares under a rugged and confused figure, and doth not represent any distinct image, so that both in respect of the matter and the forme it may be probable enough, that those spots and brighter parts may shew the distinction betwixt the Sea and Land in that other world.

Proposition. 8.

The spots represent the Sea, and the brighter parts the Land.

WHen I first compared the nature of our earth and water with those appearances in the Moone; I concluded contrary to the proposition, that the brighter parts represented the water, and the spots the land; of this opinion likewise was *Kepler* at the first, but my second thoughts, and the reading of others, have now convinced me (as after he was) of the truth of that proposition which I have now set downe. But before I come to the confirmation of it, I shall mention those scruples which at first made me doubt of the truth of this opinion.

Opt. Astro. c. 6. num. 9. Dissert. cum nuntio Gal.

1. It may be objected, 'tis probable, if there be any such sea and land as ours, that it bears some proportion and similitude with ours: but now this proposition takes away

way all likeneſſe betwixt them, for whereas the ſuperficies of our earth is but the third part of the whole ſurface in the globe, two parts being overſpread with the water (as *Scaliger* obſerves) yet here according to this opinion, the Sea ſhould be leſſe then the land, ſince there is not ſo much of the beſpotted, as there is of the enlightened parts, wherfore 'tis probable, that either there is no ſuch thing at all, or elſe that the brighter parts are the Sea.

Exercit. 38.

2. The water, by reaſon of the ſmoothneſſe of its ſuperficies, ſeemes better able to reflect the Sun beames then the earth, which in moſt places is ſo full of ruggedneſſe of graſſe and trees, and ſuch like impediments of reflexion, and beſides, cómon experience ſhewes, that the water ſhines with a greater and more glorious brightneſſe then the earth, therefore it ſhould ſeeme that the ſpots are the earth, and the brighter parts the water.

But

But to the firſt it may be anſwered.

1. There is no great probability in this conſequence, that becauſe 'tis ſo with us, therefore it muſt be ſo with the parts of the Moone, for ſince there is ſuch a difference betwixt them in divers other reſpects, they may not perhaps agree in this.

2. That aſſertion of *Scaliger* is not by all granted for a truth. *Fromondus* with others thinke that the ſuperficies of the Sea and Land in ſo much of the world as is already diſcovered is equall and of the ſame extention. *De Meteris l. 5. c. 1. Art. 1.*

3. The Orbe of thicke and vaporous ayer which incompaſſes the Moone, makes the brighter parts of that Planet appeare bigger then in themſelves they are; as I ſhall ſhew afterwards.

To the ſecond it may be anſwered, that though the water be of a ſmooth ſuperficies, and ſo may ſeeme moſt fit to reverberate the light,

light, yet becauſe 'tis of a perſpicuous nature, therefore the beames muſt ſinke into it, and cannot ſo ſtrongly and clearely be reflected. *Sicut in ſpeculo ubi plumbum abraſum fuerit*, (ſaith *Cardan*) as in Looking-glaſſes where part of the lead is razed of, and nothing left behind to reverberate the image, the ſpecies muſt there paſſe through and not backe againe; ſo it is where the beames penetrate and ſinke into the ſubſtance of the body, there cannot be ſuch an immediate and ſtrong reflexion as when they are beate backe from the ſuperficies, and therefore the Sunne cauſes a greater heate by farre upon the Land then upon the water. Now as for that experiment where tis ſayd, that the waters have a greater brightneſſe then the Land: I anſwere, 'tis true onely there where they repreſent the image of the Sunne or ſome bright cloud, and not in other places, as is very plaine

plaine by common obſervation.

So that notwithſtanding thoſe doubts, yet this propoſition may remaine true, that the ſpots may be the Sea, and the brighter parts the Land. Of this opinion was *Plutarch*: unto him aſſented *Keplar* and *Galilæus*, whoſe words are theſe, *Si quis veterum Pythagoreorum ſententiam exuſcitare velit, lunam ſcilicet eſſe quaſi tellurem alteram, ejus pars lucidior terrenam ſuperficiem, obſcurior verò aqueam magis congruè repræſentet Mihi autem dubium fuit nunquam terreſtris globi à longè conſpecti, atq; radiis ſolaribus perfuſi, terream ſuperficiem clariorem, obſcuriorem vero aqueam ſeſe in conſpectum daturam.* "If any man have a "mind to renue the opinion of "the *Pythagoreans*, that the "Moone is another earth, then "her brighter parts may fitly re- "preſent the earths ſuperficies, "and the darker part the water: "and for my part, I never doubted "but

De facie lun. Diſſertatio. Nunc. Syd.

"but that our earthly globe being "shined upon by the Sunne, and "beheld at a great distance, the "Land would appeare brighter "and the Sea more obscurely. The reasons may be

1. That which I urged about the foregoing chapter, because the water is the thinner part, and therfore must give lesse light.

2, Because observation tels us, that the spotted parts are alwaies smooth and equall, having every where an equality of light when once they are enlightned by the Sunne, whereas the brighter parts are full of rugged gibbosities and mountaines having many shades in them, as I shall shew more at large afterwards.

Apologia pro Galilæo.

That in this Planet there must be Seas, *Campanella* indeavours to prove out of Scripture interpreting *the waters above the Firmament*, spoken of in *Genesis* to bee meant of the Sea in this world. For (saith he) 'tis not likely that there

there are any ſuch waters above the Orbes to moderate that heate which they receive from their ſwift motion (as ſome of the Fathers thinke) nor did *Moſes* meane the Angels which may be called ſpirituall waters, as *Origen* and *Auſtin* would have it, for both theſe are rejected by the generall conſent: Nor could he meane any waters in the ſecond region, as moſt Commentators interpret it. For firſt there is nothing but vapours, which though they are afterwards turned into water, yet while they remaine there, they are onely the matter of that element, which may as well be fire or earth or ayre. 2. Thoſe vapours are not above the expanſum but in it. So that hee thinkes there is no other way to ſalve all, but by making the Planets ſeverall worlds with Sea & Land with ſuch Rivers and Springs as we have here below: Eſpecially ſince *Eſdras* ſpeakes of the ſprings above the Fir-

Confeſſion. l.13.c.32.

2.Eſdr.4.7.

Firmament, but I cannot agree with him in this, nor doe I thinke that any such thing can be proved out of Scripture.

Before I proceede to the next position, I shall first answer some doubts which might be made against the generalitie of this truth, whereby it may seeme impossible that there should be either Sea or Land in the Moone; for since she moves so swiftly as Astronomers observe, why then does there nothing fall from her, or why doth shee not shake something out by the celerity of her revolution? I answere, you must know that the inclination of every heavy body to its proper Center doth sufficiently tie it unto its place, so that suppose any thing were separated, yet must it necessarily returne againe, and there is no more danger of their falling into our world then there is feare of our falling into the Moone.

But yet there are many fabulous relations

relations of such things as have dropped thence. There is a tale of the Nemean Lyon that *Hercules* slew, which first rushing among the heards out of his unknowne den in the Mountaine of *Cytheron* in *Bœotia*, the credulous people thought he was sent from their Goddesse the Moone. And if a whirle-winde did chance to snatch any thing up, and afterwards raine it downe againe, the ignorant multitude are apt to believe that it dropt from Heaven. Thus *Aristotle* relates the story of a Calfe which fell downe in a storme, the beholders thinking it a Moon-calfe, and that it fell thence. So *Cardan* travelling upon the Apennine Mountaines, a sudden blast tooke off his hat, which if it had beene carryed farre, he thinks the peasants who had perceived it to fall, would have sworne it had rained hats. After some such manner many of our prodigies come to passe, and the people are wil-

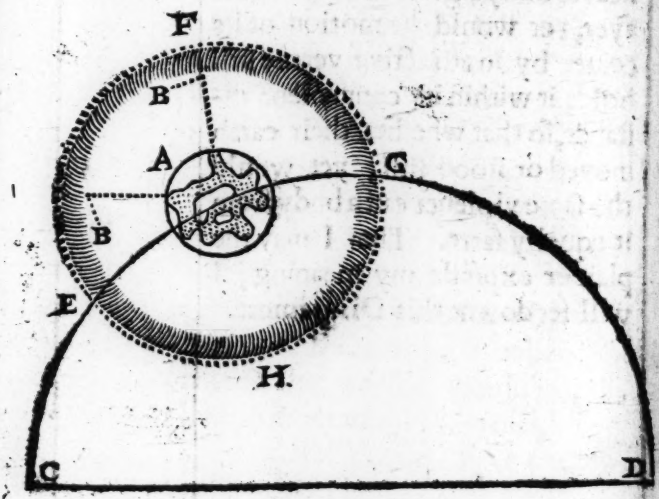
ling to believe any thing, which they may relate to others as a very strange and wonderfull event. I doubt not but the Trojan *Palladium*, the Romane *Minerva*, and our Ladies Church at *Loretto*, with many sacred reliques preserved by the Papists might droppe from the Moone as well as any of these.

But it may be againe objected, suppose there were a bullet shot up in that world, would not the Moone runne away from it, before it could fall downe, since the motion of her body (being every day round our earth) is farre swifter than the other, and so the bullet must be left behind, and at length fall downe to us. To this I answer,

1. If a bullet could bee shot so farre till it came to the circumference of those things which belong to our center, then it would fall downe to us.

2. Though there were some heavie

heavie body a great height in that ayer, yet would the motion of its center by an attractive vertue ſtill holds it within its convenient diſtance, ſo that whether their earth moved or ſtood ſtill, yet would the ſame violence call a body from it equally farre. That I may the plainer expreſſe my meaning, I will ſet downe this Diagramme.



Suppoſe this earth were A, which was to move in the circle C, D. and let the bullet be ſuppoſed at B. within its proper verge; I ſay, whether this earth did ſtand ſtil or move ſwiftly towards D, yet the bullet would ſtill keepe at the ſame diſtance by reaſon of that Magneticke vertue of the center (if I may ſo ſpeake) whereby all things within its ſpheare are attracted

tracted with it. So that the violence to the bullet, being nothing elſe but that whereby 'tis removed from its center, therefore an equall violence can carry a body from its proper place, but at an equall diſtance whether or no the center ſtand ſtill or move.

The impartiall Reader may finde ſufficient ſatisfaction for this and ſuch other argumens as may be urged againſt the motion of that earth in the writings of *Copernicus* and his followers, unto whom for brevities ſake I will referre them.

Propoſition 9.

That there are high Mountaines, deepe vallies, and ſpacious plaines in the body of the Moone.

THough there are ſome who thinke Mountaines to bee a deformity to the earth, as if they

were either beate up by the flood, or elſe caſt up like ſo many heaps of rubbiſh left at the creation, yet if well conſidered, they will bee found as much to conduce to the beauty and conveniency of the univerſe as any of the other parts. Nature (ſaith *Pliny*) purpoſely framed them for many excellent uſes: partly to tame the violence of greater Rivers, to ſtrengthen certaine joynts within the veines and bowels of the earth, to break the force of the Seas inundation, and for the ſafety of the earths inhabitants, whether beaſts or men. That they make much for the protection of beaſts the Pſalmiſt teſtifies, *The higheſt hils are a refuge for the wild goates, and the rockes for conies.* The Kingly Prophet had learned the ſafety of theſe by his owne experience, when hee alſo was faine to make a mountaine his refuge from the fury of his Maſter *Saul*, who perſecuted him in the wilderneſſe.

Nat. hiſt. l. 36. c. 1.

Pſal. 104. v. 18.

True

True indeed, ſuch places as theſe keepe their neighbours poore, as being moſt barren, but yet they preſerve them ſafe, as being moſt ſtrong, witneſſe our unconquered *Wales* and *Scotland*, whoſe greateſt protection hath beene the naturall ſtrength of their Countrey, ſo fortified with Mountaines, that theſe have alwaies beene unto them ſure retraites from the violence and oppreſſion of others, wherefore a good Authour doth rightly call them natures bulwarkes caſt up at God Almighties owne charges, the ſcornes and curbes of victorious armies, which made the Barbarians in *Curtius* ſo confident of their owne ſafety, when they were once retired to an inacceſſible mountaine, that when *Alexanders* Legate had brought them to a parley and perſwading them to yeeld, told them of his maſters victories, what Seas and Wilderneſſes he had paſſed, they replied that all that might

be, but could *Alexander* fly too? Over the Seas he might have ships, and over the land horses, but hee must have wings before hee could get up thither. Such safety did those barbarous nations conceive in the mountaines whereunto they were retyred, certainly then such usefull parts were not the effect of mans sinne, or produced by the Worlds curse the flood, but rather at the first created by the goodnesse and providence of the Almighty.

So that if I intend to prove that the Moone is such a habitable world as this is, 'tis requisite that I shew it to have the same conveniences of habitation as this hath, and here if some Rabbi or Chymick were to handle the point they would first prove it out of Scripture, from that place in *Moses* his blessing, where hee speakes of the ancient mountaines and lasting hills, *Deut.* 33. 15. ראשי קדם וגבעות עולם

Deut. 33. 15.

for

for having immediately before mentioned those blessings which should happen unto *Joseph* by the influence of the Moone, he does presently exegetically iterate them in blessing him with the chiefe things of the ancient mountaines and lasting hills; you may also see the same expression used in *Iacobs* blessing of *Ioseph*. Gen. 49. 26.

But however we may desie *pro* or *con* in Philosophy, yet we must not jest with divine truths, or bring Scripture to patronize any fancy of our owne, though, perhaps, it be a truth. For the better proofe of this proposition, I might here cite the testimony of *Diodorus*, who thought the Moone to be full of rugged places, *vel ut terrestribus tumulis superstitiosam*, but he erred much in some circumstances of this opinion, especially where hee saies, there is an Iland amongst the *Hyperboreans*, wherein those hills may to the eye be plainly discovered, and for this reason

reason * *Celius* calls him a fabulous Writer, but you may see more expresse authority for the proofe of this in the opinions of *Anaxagoras* and *Democritus*, who held that this Planet was full of champion grounds, mountains and vallies, and this seemed likewise probable unto *Augustinus Nifus*, whose words are these: *Forsitan non est remotum dicere lunæ partes esse diversas, veluti sunt partes terræ, quarum aliæ sunt vallosæ, aliæ montosæ, ex quarum differentia efficipotest facies illa lunæ; nec est rationi dissonum, nam luna est corpus imperfectè Sphæricum, cum sit corpus ob ultimo cœlo elongatum, ut supra dixit Aristoteles.* Perhaps, "it would not be amisse to say "that the parts of the Moone "were divers, as the parts of this "earth, whereof some are vallies, "and some mountaines, from the "difference of which, some spots "in the Moone may proceed; nor "is this against reason, for that "Planet

* *Lell. aut l. 1. cap. 15. Plut. de plac. l. 2. c. 25.*

De Cœlo. l. 2. part. 49.

cc Planet cannot be perfectly spheecc rical, since 'tis so remote a bodcc from the first orbe, as *Aristotle* cc had said before. You may see this truth assented unto by *Blancanus* the Jesuit, and by him confirmed with divers reasons. *Keplar* hath observed in the Moones eclipses, that the division of her inlightened part from the shaded, was made by a crooked unequall line, of which there cannot be any probable cause conceived, unlesse it did arise from the ruggednesse of that planet, for it cannot at all be produc'd from the shade of any moũtains here upon earth, because these would be so lessened before they could reach so high in a conicall shadow, that they would not be at all sensible unto us (as might easily be demonstrated) nor can it be conceived what reason of this difference there should be in the Sunne. Wherefore there being no other body that hath any thing to doe in eclipses, we must necessarily

De Mundi fab. pars 3. c. 4.

Astron. Opt. c. 6. num. 9

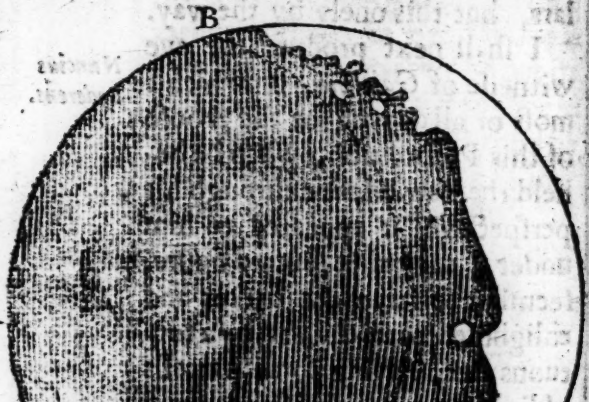
rily conclude, that it is cauſed by a variety of parts in the Moone it ſelfe, and what can there be but its gibboſities? Now if you ſhould aske a reaſon why there ſhould be ſuch a multitude of theſe in that Planet, the ſame *Keplar* ſhall jeſt you out an anſwer, for ſuppoſing (ſaith hee) thoſe inhabitants are bigger than any of us in the ſame proportion, as their daies are longer than ours, vix. by fifteen times it may be for want of ſtones to erect ſuch vaſt houſes as were requiſite for their bodies, they are faine to digge great and round hollowes in the earth, where they may both procure water for their thirſt, and turning about with the ſhade, may avoid thoſe great heats which otherwiſe they would be liable unto; or if you will give *Ceſar la Galla* leave to gueſſe in the ſame manner, he would rather think that thoſe thirſty nations caſt up ſo many and ſo great heaps of earth in digging of their wine cellars,

lars, but this onely by the way.

I ſhall next produce the eye witneſſe of *Galileus*, on which I moſt of all depend for the proofe of this Propoſition, when he beheld the new Moone through his perſpective it appeared to him under a rugged & ſpotted figure, ſeeming to have the darker and enlightned parts divided by a tortuous line, having ſome parcells of light at a good diſtance from the other, and this difference is ſo remarkable, that you may eaſily perceive it through one of thoſe ordinary perſpectives, which are commonly ſold amongſt us, but for your better apprehending of what I deliver, I will ſet downe the Figure as I find it in *Galileus*:

Nuncius Syderens.

Suppoſe



Suppose A B C D to represent the appearance of the Moones body being in a sextile, you may see some brighter parts separated at a pretty distance from the other, which can be nothing else but a reflexion of the Sunne beames upon some parts that are higher then the rest, and those obscure gibbo-

sities

ſirtes which ſtand out towards the enlightened parts muſt be ſuch hollow and deepe places whereto the rayes cannot reach, but when the Moone is got farther off from the Sunne, and come to that fulneſſe, as this line B D doth repreſent her under, then doe theſe parts alſo receive an equall light, excepting onely that difference which doth appeare betwixt their ſea and land. And if you do conſider how any rugged body would appeare, being enlightened, you would eaſily conceive that it muſt neceſſarily ſeeme under ſome ſuch gibbous unequall forme, as the Moone is here repreſented. Now for the infalibility of theſe appearances, I ſhall referre the reader to that which hath beene ſaid in the 6th. Propoſition.

But *Ceſar la Galla* affirmes, that all theſe appearances may conſiſt with a plaine ſuperficies, if wee ſuppoſe the parts of the body to be ſome of them, *Diaphanous*, and ſome

some opacous; and if you object that the light which is convayed to any diaphanous part in a plaine superficies must be by a continued line, whereas here there appeare many brighter parts among the obscure at some distance from the rest. To this hee answers, it may arise from some secret conveiances and channels within her body, that doe consist of a more diaphanous matter which being covered over with an opacous superficies, the light passing through them may breake out a great way off, whereas the other parts betwixt may still remaine darke. Just as the River *Arethusa* in *Sicily* which runnes under ground for a great way, and afterwards breakes out againe. But because this is one of the chiefest fancies whereby hee thinkes hee hath fully answered the arguments of this opinion, I will therefore set downe his answere in his owne words, least the Reader might suspect more in them

Cap. 11.

them then I have expreſſed. *Non eſt impoſſibile circus ductus diaphani & perſpicui corporis, ſed opaca ſuperficie protendi, uſq; in diaphanam aliquam ex profundo in ſuperficiem, emergentem partem, per quos ductus lumen longo poſtmodum interſtitio erumpat, &c.* But I reply, if the ſuperficies betwixt theſe two enlightened parts remaine darke becauſe of its opacity, then would it alwaies be darke, and the Sunne could not make it partake of light more then it could of perſpicuity: But this contradicts all experience as you may ſee in *Galileus*, who affirmes that when the Sunne comes nearer to his oppoſition, then that which is betwixt them, both is enlightned as well as either. Nay this oppoſes his owne eye-witneſſe, for he confeſſes himſelfe that he ſaw this by the glaſſe. He had ſaid before that he came to ſee thoſe ſtrange ſights diſcovered by *Galileus* his glaſſe with an intent of contradiction and you

may reade that confirmed in the weakeneſſe of this anſwere, which rather bewrayes an obſtinate then a perſwaded will, for otherwiſe ſure hee would never have undertooke to have deſtroyed ſuch certaine proofes with ſo groundleſſe a fancy.

But it may bee objected, that 'tis almoſt impoſſible, and altogether unlikely that in the Moone there ſhould be any mountaines ſo high as thoſe obſervations make them, for doe but ſuppoſe according to the common principles, that the Moones diameter unto the Earths is very neere to the proportion of 2. to 7, ſuppoſe withall that the Earths diameter containes about 7000 Italian miles, and the Moones 2000 (as is commonly granted) now *Galileus* hath obſerved that ſome parts have been enlightened when they were the twentieth part of the diameter diſtant from the common terme of illumination, ſo that hence

hence it must necessarily follow that there may bee some Mountaines in the Moone so high, that they are able to cast a shadow a 100 miles off. An opinion that sounds like a prodigie or a fiction; wherefore 'tis likely that either those appearances are caused by somewhat else besides mountaines, or else those are fallible observations, from whence may follow such improbable inconceiveable consequences.

But to this I answere:

1. You must consider the height of the Mountaines is but very little, if you compare them to the length of their shadowes. Sr. *Walter Rawleigh* observes that the Mount *Athos* now called *Lacon* casts its shadow 300 furlongs, which is above 37 miles, and yet that Mount is none of the highest, nay *Solinus* (whom I should rather believe in this kinde) affirmes that this Mountaine gives his shadow quite over the Sea, from

Hist. l. 1. c. 7. §. 11.

Poly. histor. c. 21.

Macedon to the Ile of *Lemnos* which is 700 furlongs or 84 miles, and yet according to the common reckoning it doth scarce reach 4 miles upwards, in its perpendicular height.

2. I affirme that there are very high Mountaines in the Moone. *Keplar* and *Galileus* thinke that they are higher than any which are upon our earth. But I am not of their opinion in this, because I suppose they goe upon a false ground whilst they conceive that the highest mountaine upon the earth is not above a mile perpendicular.

Whereas 'tis the common opinion and found true enough by observation, that *Olympus*, *Atlas*, *Taurus* and *Ætna*, with many others are much above this height. *Teneriffa* in the Canary Ilands is proved by computation to bee above 8 miles perpendicular, and about this height is the mount *Pariacaca* in *America*. Sr. *Walter Rawleigh*

Hist. l. 1. c. 7. §. 11.

Raunleigh seemes to thinke, that the highest of these is neere 30 miles upright: nay *Aristotle* speaking of *Caucasus* in *Asia*, assumes it to bee visible for 500 miles, as some interpreters finde by computation, from which it will follow, that it was 78 miles perpendicularly high, as you may see confirmed by *Jacobus Mazonius*, and out of him in *Blancanus* the Jesuite. But this deviates from the truth more in excesse then the other doth in defect. However though these in the moone are not so high as some amongst us, yet certaine it is they are of a great height, and some of them at the least foure miles perpendicular. This I shall prove from the observation of *Galilæus*, whose glasse can shew this truth to the senses, a proofe beyond exception and certaine that man must needs be of a most timerous faith who dares not believe his owne eye.

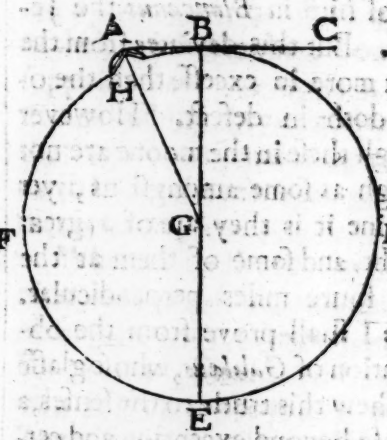
Meteor. l. 1. c. 11.

Comparatio Arist. cum Platone Sect. 3. c. 5.

Expos. in loc. Math. Arlis. loc. 148.

By that perspective you may

plainely discerne some enlightned parts (which are the mountaines) to be distant from the other about the twentieth part of the diameter. From whence it will follow, that those mountaines must necessarily be at the least foure Italian miles in height.



For let B D E F be the body of the moone, A B C will be a ray or beame of the Sunne, which enlightens a mountaine at A and B is

B is the point of contingency, the distance betwixt A and B must bee supposed to be the twentieth part of the diameter which is an 100 miles, for so far are some enlightened parts severed from the common terme of illumination. Now the aggregate of the quadrate from *A B* a hundred, and *B G* a 1000 will bee 1010000, unto which the quadrate arising from *A G* must be equall according to the 47th proposition in the first booke of elements. Therefore the whole line *A G* is somewhat more than 104, and the distance betwixt H A must be above 4 miles, which was the thing to be proved.

But it may be againe objected, if there be such rugged parts, and so high mountaines, why then cannot wee discerne them at this distance, why doth the moone appeare unto us so exactly round, and not rather as a wheele with teeth?

I answere, by reason of too great a distance, for if the whole body appeare to our eye so little, then those parts which beare so small a proportion to the whole will not at all be sensible.

But it may be replied, if there were any such remarkeable hils, why does not the limbe of the moone appeare like a wheele with teeth to those who looke upon it through the great perspective on whose witnesse you so much depend? or what reason is there that she appeares as exactly round through it as shee doth to the bare eye? certainely then either there is no such thing as you imagine, or else the glasse failes much in this discovery.

To this I shall answere out of *Galileus*.

1. You must know that there is not meerely one ranke of mountaines about the edge of the moone, but divers orders, one mountaine behind another, and so

ſo there is ſomewhat to hinder thoſe void ſpaces which otherwiſe, perhaps, might appeare.

Now where there be many hils, the ground ſeemes even to a man that can ſee the tops of all. Thus when the ſea rages, and many vaſt waves are lifted up, yet all may appeare plaine enough to one that ſtands at the ſhore. So where there are ſo many hils, the inequality will be leſſe remarkable, if it be diſcerned at a diſtance.

2. Though there be mountains in that part which appeares unto us, to be the limbe of the Moone, as well as in any other place, yet the bright vapours hide their appearance: for there is an orbe of thicke vaporous aire that doth immediatly compaſſe the body of the Moone, which though it have not ſo great opacity, as to terminate the light, yet being once enlightened by the Sunne, it doth repreſent the body of the Moone under a greater forme, and hinders our

out sight from a distinct view of her true circumference. But of this in the next Chapter.

I have now sufficiently proved, that there are hills in the Moone, and hence it may seeme likely that there is also a world, for since providence hath some speciall end in all its workes, certainly then these mountaines were not produced in vaine, and what more probable meaning can wee conceive there should be, than to make that place convenient for habitation.

Proposition 10.

That there is an Atmo-sphera, or an orbe of grosse vaporous aire, immediately encompassing the body of the Moone.

AS that part of our aire which is neereſt to the earth, is of a thicker substance than the other, by reason tis alwaies mixed with some

some vapours, which are continually exhaled into it. So is it equally requisite, that if there be a world in the Moone, that the aire about that should be alike qualified with ours. Now, that there is such an orbe of grosse aire, was first of all (for ought I can reade) observed by *Meslin*, afterwards assented unto by *Keplar* and *Galileus*, and since by *Baptista Cisatus*, *Sheiner* with others, all of them confirming is by the same arguments which I shall onely cite, and then leave this Proposition.

Vide Euseb. Nierem. *de Nat. Hist. l. 2. c. 11.*

1. 'Tis observed, that so much of the Moone as is enlightened, is alwaies part of a bigger circle then that which is darker. Their frequent experience hath proved this, and an easie observation may quickely confirme it. But now this cannot proceede from any other cause so probable, as from this orbe of aire, especially when we consider how that planet shining with a borrowed light, doth not send

send forth any such rayes as may make her appearance bigger then her body.

2. 'Tis observed in the Solary eclipses, that there is a great trepidation about the body of the Moone, from which we may likewise argue an Atmo-sphæra, since we cannot well conceive what so probable a cause there should be of such an appearance as this; *Quod radii Solares à vaporibus Lunam ambientibus fuerint intercisi*, that the Sun beames were broken and refracted by the vapours that encompassed the Moone.

Scheiner. Ros. Vrs. l. 4. pars 2. c. 27.

3. I may adde the like argument taken from another observation which will be easily tried and granted. When the Sunne is eclipsed, wee discerne the Moone as shee is in her owne naturall bigenesse, but then she appeares somewhat lesse then when shee is in the full, though she be in the same place of her supposed excentrick and epicycle, and therefore *Tycho* hath

hath calculated a Table for the Diameter of the divers new Moones. But now there is no reason so probable to salve this appearance, as to place an orbe of thicker aire, neere the body of that Planet, which may be enlightened by the reflected beames, and through which the direct raies may easily penetrate.

But some may object that this will not consist with that which was before delivered, where I said, that the thinnest parts had least light.

If this were true, how comes it to passe then, that this aire should be as bright as any of the other parts, when as tis the thinnest of all?

I answer, if the light be received by reflection, then the thickest body hath most, because it is best able to beate backe the raies, but if the light be received by illumination (especially if there be an opacous body behinde, which

which may double the beames by reflexion) as it is here, then I deny not but a thinne body may retaine much light, and perhaps, some of those appearances which wee take for fiery comets, are nothing else but a bright cloud enlightened, so that probable it is, there may be such aire without the Moone, and hence it comes to passe, that the greater spots are onely visible towards her middle parts, and none neere the circumference, not but that there are some as well in those parts as else where, but they are not there perceiveable, by reason of those brighter vapours which hide them.

Proposition

Proposition. II.

That as their world is our Moone, so our world is their Moone.

I Have already handled the first thing that I promised according to the Method which *Aristotle* uses in his Booke *de Mundo*, and shew'd you the necessary parts that belong to this world in the Moone. In the next place 'tis requisite that I proceed to those things which are extrinsecall unto it, as the Seasons, the Meteors, and the Inhabitants.

1. Of the Seasons;

And if there be such a world in the Moone, 'tis requisite then that their seasons should be some way correspondent unto ours, that they should have Winter and Summer, night and day, as wee have.

Now that in this Planet there is some similitude of Winter and Sum-

Summer is affirmed by *Aristotle* himselfe, since there is one hemisphear that hath alwaies heate and light, and the other that hath darknesse and cold. True indeed, their daies and yeeres are alwaies of one and the same length, but tis so with us also under the Poles, and therefore that great difference is not sufficient to make it altogether unlike ours, nor can we expect that every thing there should be in the same manner as it is here below, as if nature had no way but one to bring about her purposes. Wee may easily see what great differences there are amongst us, betwixt things of the same kinde. Some men (say they) there are, who can live onely upon smells, without eating any thing, and the same Plant, saith *Besoldus*, hath sometimes contrary effects. *Mandragora* which growes in Syria, inflames the lust, whereas *Mandragora* which grows in other places doth coole the blood & quench lust.

De gen. animal. l. 4. 12.

Plut. de fac. De naturâ populorum c. 3.

Now

Now if with us there be ſuch great difference betwixt things of the ſame kinde, we have no reaſon then to thinke it neceſſary that both theſe worlds ſhould be altogether alike, but it may ſuffice if they bee correſpondent in ſomething onely, however it may be queſtioned whether it doth not ſeeme to be againſt the wiſedome of providence, to make the night of ſo great a length, when they have ſuch a long time unfit for worke? I anſwere no, ſince tis ſo, and more with us alſo under the poles; and beſides, the generall length of their night is ſomewhat abated in the bigneſſe of their Moone which is our earth. For this returnes as great a light unto that Planet, as it receives from it. But for the better proofe of this, I ſhall firſt free the way from ſuch opinions as might otherwiſe hinder the ſpeede of a clearer progreſſe.

Plutarch one of the chiefe patrons *Plut. de fac. lunæ.*

trons of this world in the Moone, doth directly contradict this propoſition; affirming, that thoſe who live there may diſcerne our world as the dregges and ſediment of all other creatures, appearing to them through clouds and foggy miſts, and that altogether devoid of light, being baſe and unmoveable, ſo that they might well imagine the darke place of damnation to be here ſituate, and that they onely were the inhabiters of the world, as being in the midſt betwixt Heaven and Hell.

To this I may anſwere, 'tis probable that *Plutarch* ſpake this inconſiderately, and without a reaſon, which makes him likewiſe fall into another abſurditie, when he ſayes our earth would appeare immoveable, whereas queſtionleſſe though it did not, yet would it ſeeme to move, and theirs to ſtand ſtill, as the Land doth to a man in a Shippe; according to

that

that of the Poet :

Provehimur portu, terræq; urbesq; recedunt.

And I doubt not but that ingenuous Authour would easily have recanted if hee had beene but acquainted with those experiences which men of latter times have found out, for the confirmation of this truth.

2. Unto him assents *Macrobius*, whose words are these ; *Terra accepto solis lumine clarescit, tantummodò, non relucet.* "The earth "is by the Sunne-beames made "bright, but not able to enlighten "any thing so farre. And his reason is, because this being of a thicke and grosse matter, the light is terminated in its superficies, and cannot penetrate into the substance; whereas the moone doth therefore seeme so bright to us, because it receives the beames within it selfe. But the weaknesse of this assertion, may bee easily manifest by a common experience,

Somn. Scip. l. 1. c. 19.

for polished steele (whose opacity will not give any admittance to the rayes) reflects a stronger heate then glasse, and so consequently a greater light.

3. 'Tis the generall consent of Philosophers, that the reflection of the Sunne-beames from the earth doth not reach much above halfe a mile high, where they terminate the first region, so that to affirme they might ascend to the moone, were to say, there were but one region of aier, which contradicts the proved and received opinion.

Unto this it may be answered:

That it is indeed the common consent, that the reflexion of the Sunne-beames reach onely to the second region, but yet some there are, and those too Philosophers of good note, who thought otherwise. Thus *Plotinus* is cited by *Calius*, *Si concipias te in sublimi quopiam mundi loco, unde oculis subjiciatur terræ moles aquis circumfusa*

Ant. lect. l. 1. c. 4.

eumfuſa, & ſolis ſyderumq; radiis illuſtrata, non aliam profecto viſam iri probabile eſt, quam qualis modo viſatur lunaris globi ſpecies. "If "you did conceive your ſelfe to "bee in ſome ſuch high place, "where you might diſcerne the "whole Globe of the earth, and "water, when it was enlightned "by the Sunnes rayes, 'tis probable "it would then appeare to you in "the ſame ſhape as the moone "doth now unto us. Thus alſo *Carolus Malapertius*, whoſe words are theſe. *Terra hæc noſtra ſi in luna conſtituti eſſemus, ſplendida prorſus quaſi non ignobilis planeta, nobis appareret.* "If wee "were placed in the moone, and "from thence beheld this our "earth, it would appeare unto us "very bright, like one of the "nobler Planets. Unto theſe doth *Fromondus* aſſent, when he ſayes, *Credo equidem quod ſi oculus quiſpiam in orbe lunari foret, globum terræ & aquæ inſtar ingentis ſyderis*

Præfat. ad Auſtriacæ ſyd.

Meteor. l. 1. c. 2. Art. 2.

à sole illustrem conspiceret. "I "believe that this globe of earth "and water would appeare like "some great Starre to any one, "who should looke upon it from "the moone. Now this could not be, nor could it shine so remarkably, unlesse the beames of light, were reflected from it. And therefore the same *Fromondus* expresly holds, that the first region of ayre is there terminated, where the heate caused by reflexion begins to languish, whereas the beames themselves doe passe a great way further. The chiefe argument which doth most plainely manifest this truth, is taken from a common observation which may be easily tryed.

If you behold the Moone a little before or after the conjunction, when she is in a sextile with the Sunne, you may discerne not onely the part which is enlightned, but the rest also to have in it a kind of a duskish light, but if you chuse

chuſe out ſuch a ſcituation, where ſome houſe or chimney (being ſome 70 or 80 paces diſtant from you) may hide from your eye the enlightned hornes, you may then diſcerne a greater and more remarkeable ſhining in thoſe parts unto which the Sunne beames cannot reach; nay there is ſo great a light, that by the helpe of a good perſpective you may diſcerne its ſpots. Inſo much that *Blancanus* the Jeſuite ſpeaking of it ſayes, *Hæc experientia ita me aliquando fefellit, ut in hunc fulgorem caſu ac repente incidens, exiſtimarim novo quodam miraculo tempore adoleſcentis lunæ factum eſſe plenilunium.* "This experiment "did once ſo deceive mee, that "happening upon the ſight of this "brightneſſe upon a ſudden, I "thought that by ſome new mi- "racle the Moone had beene got "into her full a little after her "change.

De mundi ſab. p. 32. c. 3.

But now this light is not proper

to the Moone, it doth not proceed from the rayes of the Sunne which doth penetrate her body, nor is it caused by any other of the Planets and Starres. Therefore it must necessarily follow, that it comes from the earth. The two first of these I have already proved, and as for the last, it is confidently affirmed by *Cælius*, *Quod si in disquisitionem evocet quis, an lunari syderi lucem fœnerent planetæ item alii, asseveranter astruendum non fœnerare.* "If any should aske "whether the other Planets lend "any light to the Moone; I answer "they doe not. True indeed, the noble *Tycho* discussing the reason of this light attributes it to the Planet *Venus*, and I grant that this may convey some light to the Moone, but that it is not the cause of this whereof wee now discourse, is of it selfe sufficiently plaine, because *Venus* is sometimes over the Moone, when as shee cannot convey any light to that part

l. 20. c. 5.

Progym. 1.

part which is turned from her.

It doth not proceede from the fixed ſtarres, for then it would retaine the ſame light in eclipſes, whereas the light at ſuch times is more ruddy and dull. Then alſo the light of the Moone would not be greater or leſſer, according to its diſtance from the edge of the earths ſhadow, ſince it did at all times equally participate this light of the ſtarres.

Now becauſe there is no other body in the whole Univerſe, ſave the earth, it remaines that this light muſt neceſſarily be cauſed by that which with a juſt gratitude repaies to the Moone, ſuch illumination as it receives from her.

And as loving friends equally participate of the ſame joy and griefe, ſo doe theſe mutually partake of the ſame light from the Sunne, and the ſame darkeneſſe from the eclipſes, being alſo ſeverally helped by one another in their

their greateſt wants: For when the Moone is in conjunction with the Sunne, and her upper part receives all the light, then her lower Hemiſpheare (which would otherwiſe be altogether darke) is enlightened by the reflexion of the Sunne beames from the earth. When theſe two planets are in oppoſition, then that part of the earth which could not receive any light from the Sunne beames, is moſt enlightened by the Moone, being then in her full; and as ſhe doth moſt illuminate the earth when the Sunne beames cannot, ſo the gratefull earth returnes to her as great, nay greater light when ſhee moſt wants it; ſo that alwaies that viſible part of the Moone which receives nothing from the Sunne, is enlightened by the earth, as is proved by *Galilæus*, with many more arguments, in that Treatiſe which he calls *Syſtema mundi*. True indeed, when the Moone comes to a quartile, then you

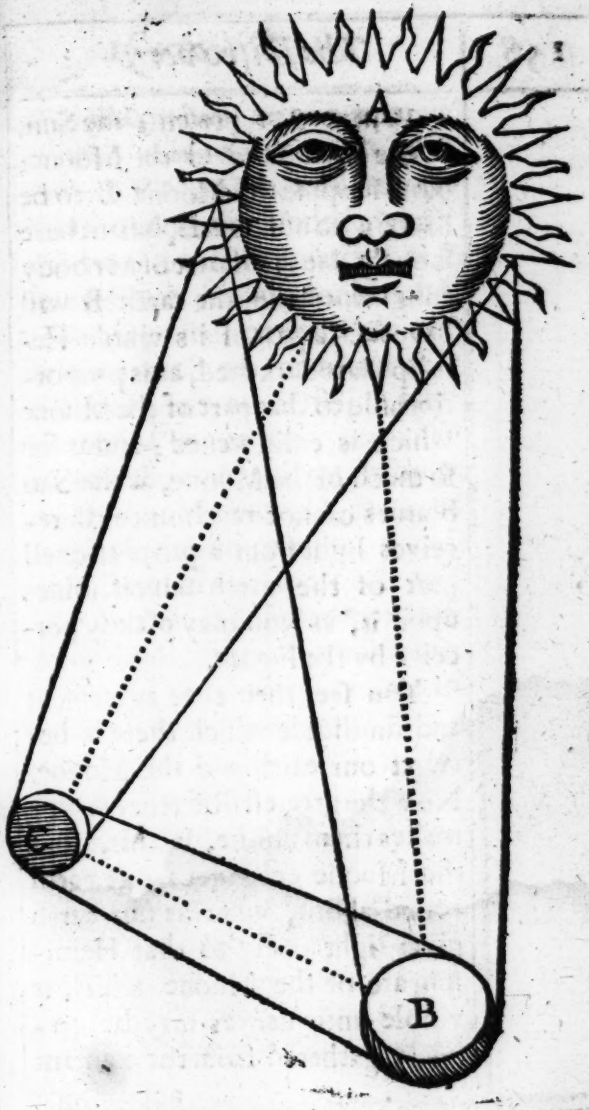
you can neither discerne this light, nor yet the darker part of her body, but the reason is, because of the exuperancy of the light in the other parts. *Quippe illustratum medium speciem recipit valentiorem*, the cleaner brightnesse involves the weaker, it being with the species of sight, as it is with those of sound, and as the greater noise drownes the lesse, so the brighter object hides that which is more obscure. But they doe alwaies in their mutuall vicissitudes participate of one anothers light; so also doe they partake of the same defects and darknings, for when our Moone is eclipsed, then is their Sunne darkened, and when our Sunne is eclipsed, then is their Moone deprived of its light, as you may see affirmed by *Mæstin. Quod si terram nobis ex alto liceret intueri, quemadmodum deficientem lunam ex longinquo spectare possumus, videremus tempore eclipsis solis terræ aliquam*

Scal. exerc. 62.

Epit. Astro. l. 4. part. 2.

aliquam partem lumine solis defi-cere, eodem planè modo sicut ex opposito luna deficit, "If wee "might behold this globe of earth "at the same distance as we doe "the Moone in her defects, wee "might discerne some part of it "darkened in the Sunnes eclip-"ses, just so as the Moone is "in hers. For as our Moone is eclipsed by the interposition of our earth, so is their Moone eclip-sed by the interposition of theirs. The manner of this mutuall illu-mination betwixt these two you may plainly discerne in this Figure following.

Where


A
B

Where A represents the Sun, B the Earth, and C the Moone; Now suppose the Moone C to be in a sextile of increase, when there is onely one small part of her body enlightened, then the earth B will have such a part of its visible Hemisphere darkened, as is proportionable to that part of the Moone which is enlightened; and as for so much of the Moone, as the Sun beames cannot reach unto, it receives light from a proportionall part of the earth which shines upon it, as you may plainly perceive by the Figure.

You see then that agreement and similitude which there is betwixt our earth and the Moone. Now the greatest difference which makes them unlike, is this, that the Moone enlightens our earth round about, whereas our earth gives light onely to that Hemisphere of the Moone which is visible unto us, as may be certainly gathered from the constant appearance

appearance of the ſame ſpots, which could not thus come to paſſe, if the Moone had ſuch a diurnall motion about its own axis, as perhaps our earth hath. And though ſome ſuppoſe her to move in an epicycle, yet this doth not ſo turne her body round, that we may diſcerne both Hemiſpheares, for according to that hypotheſis, the motion of her eccentrick, doth turne her face towards us, as much as the other doth from us.

But now if any queſtion what they doe for a Moone who live in the upper part of her body? I anſwer, the ſolving of this is the moſt uncertaine and difficult thing that I know of concerning this whole matter. But yet I will give you two probable conjectures.

1. Perhaps, the upper Hemiſpheare of the Moone doth receive a ſufficient light from thoſe planets about it, and amongſt theſe *Venus* (it may be) beſtowes a more eſpeciall

ciall brightnesse, since *Galileus* hath plainly discerned that she suffers the same increases and decreases, as the Moone hath, and 'tis probable that this may be perceived there without the help of a glasse, because they are farre neerer it than wee. When *Venus* (saith *Keplar*) lies downe in the Perige or lower part of her supposed Epicycle, then is she in conjunction with her husband the Sunne, from whom after she hath departed for the space of ten moneths, shee gets *plenum uterum*, and is in the full.

But you'll reply, though *Venus* may bestow some light when she is over the Moone, and in conjunction, yet being in opposition, she is not visible to them, and what shall they then doe for light?

I answer, then they have none: nor doth this make so great a difference betwixt those two Hemispheares as there is with us, betwixt the places under the poles, and

and the line, but if this bee not sufficient, then I say in the second place that

2. Perhaps there may be some other enlightned body above the Moone which wee cannot discerne, nor is this altogether improbable because there is almost the like observed in Saturne, who appeares through this glasse with two lesser bodies on each side, which may supply the office of Moones, unto each hemisphere that is

So in this world also there may be some such body, though wee cannot discerne it, because the Moone is alwaies in a streight line, betwixt our eye and that. Nor is it altogether unlikely that there should bee more moones to one Orbe, because *Jupiter* also is observed to have foure such

bodies that move round about him.

But it may seeme a very difficult thing to conceive, how so grosse and darke a body as our earth, should yeeld such a cleare light as proceedes from the Moone, and therefore the Cardinall *de Cusa* (who thinkes every Starre to be a severall world) is of opinion that the light of the Sunne is not able to make them appeare so bright, but the reason of their shining is, because wee behold them at a great distance through their regions of fire which doe set a shining lustre upon those bodies that of themselves are darke. *Vnde si quis esset extra regionem ignis, terra ista in circumferentia suæ regionis per medium ignis lucida stella appareret.* "So that if a "man were beyond the region of "fire, this earth would appeare "through that as a bright Starre. But if this were the onely reason then would the Moone bee freed

De doct. ig. l. 2. c. 12.

freed from such increases and decreases as shee is now lyable unto.

Keplar thinkes that our earth receives that light whereby it shines from the Sunne, but this (saith he) is not such an intended cleare brightnesse as the Moone is capable of, and therefore hee guesses, that the earth there is of a more chokie soyle like the Ile of *Creete*, and so is better able to reflect a stronger light, whereas our earth must supply this intention with the quantity of its body, but this I conceive to be a needlesse conjecture, since our earth if all things were well considered will be found able enough to reflect as great a light. For

1. Consider its opacity, if you marke these sublunary things, you shall perceive that amongst them, those that are most perspicuous, are not so well able to reverberate the Sunne beames as the thicker bodies. The rayes passe singly

through a diaphanous matter, but in an opacous ſubſtance they are doubled in their returne and multiplyed by reflexion. Now if the moone and the other Planets can ſhine ſo clearely by beating backe the Sunne beames, why may not the earth alſo ſhine as well, which agrees with them in the cauſe of this brightneſſe their opacity.

2. Conſider what a cleare light wee may diſcerne reflected from the earth in the middeſt of Summer, and withall conceive how much greater that muſt bee which is under the line, where the rayes are more directly and ſtrongly reverberated.

3. Conſider the great diſtance at which wee behold the Planets, for this muſt needs adde much to their ſhining and therefore *Cuſanus* (in the above cited place) thinkes that if a man were in the Sunne, that Planet would not appeare ſo bright to him, as now it

it doth to us, because then his eye could discerne but little, whereas here wee may comprehend the beames as they are contracted in a narrow body. *Keplar* beholding the earth from a high mountaine when it was enlightned by the Sunne confesses that it appeared unto him of an incredible brightnesse, whereas then the reflected rayes entered into his sight obliquely; but how much brighter would it have appeared if hee might in a direct line behold the whole globe of earth and these rayes gathered together. So that if wee consider that great light which the earth receives from the Sunne in the Summer, and then suppose wee were in the Moone, where wee might see the whole earth hanging in those vast spaces where there is nothing to terminate the sight, but those beames which are there contracted into a little compasse; I say, if wee doe well consider this, wee may easily

conceive, that our earth appeares as bright to thoſe other inhabitants in the Moone, as theirs doth to us.

Propoſition 12.

That tis probable there may bee ſuch Meteors belonging to that world in the Moone, as there are with us.

PLutarch diſcuſſing this point affirmes that it is not neceſſary there ſhould be the ſame meanes of growth and fructifying in both theſe worlds, ſince nature might in her policy finde out more waies then one how to bring about the ſame effect. But however he thinks it is probable that the *Moone* her ſelfe ſendeth forth warme winds, and by the ſwiftneſſe of her motion there ſhould breathe out a ſweet and comfortable ayer, pleaſant dewes and gentle moyſture, which

which might ſerve for the refreſhing and nouriſhment of the inhabitants and plants in that other world.

But ſince they have all things alike with us, as ſea and land, and vaporous ayer encompaſſing both, I ſhould rather therefore thinke that nature there ſhould uſe the ſame way of producing meteors as ſhe doth with us (and not by a motion as *Plutarch* ſuppoſes) becauſe ſhee doth not love to vary from her uſuall operations without ſome extraordinary impediment, but ſtill keepes her beaten path unleſſe ſhe be driven thence.

One argument whereby I ſhall manifeſt this truth, may be taken from thoſe new Starres which have appeared in divers ages of the world, and by their parallax have beene diſcerned to have been above the *Moone*, ſuch as was that in *Caſſiopeia*, that in *Sagittarius*, with many others betwixt the Planets. *Hipparchus* in his time

Plin. nat. hist. l. 2. c. 26

tooke especiall notice of such as these, and therefore fancied out such constellations in which to place the Starres, shewing how many there were in every asterisme, that so afterwards posterity might know, whether there were any new Starre produced or any old one missing. Now the nature of these Comets may probably manifest, that in this other world there are other meteors also; for these in all likelihood are nothing else but such evapotations caused by the Sunne, from the bodies of the Planets. I shall prove this by shewing the improbabilities and inconveniences of any other opinion.

For the better pursuite of this 'tis in the first place requisite that I deale with our chiefe adversary, *Cæsar la Galla*, who doth most directly oppose that truth which is here to bee proved. Hee endeavouring to confirme the incorruptibility of the Heavens, and

and being there to satisfie the argument which is taken from these comets, He answers it thus: *Aut argumentum desumptum ex paralaxi non est efficax, aut si est efficax, eorum instrumentorum usum decipere, vel ratione astri vel medii, vel distantiæ, aut ergo erat in suprema parte aeris, aut si in cœlo, tum forsan factum erat ex reflectione radiorum Saturni & Jovis, qui tunc in conjunctione fuerant.* "Either "the argument from the paralax "is not efficacious, or if it be, yet "the use of the instruments might "deceive either in regard of the "starre or the *medium*, or the di- "stance, and so this comet might "be in the upper regions of the "aire, or if it were in the heavens, "there it might be produced by "the reflexion of the rayes from "*Saturne* and *Jupiter*, who were "then in conjunction. You see what shifts hee is driven to, how he runnes up and downe to many starting holes, that hee may find some

some shelter, and in stead of the strength of reason, he answers with a multitude of words, thinking (as the Proverbe is) that hee may use haile, when hee hath no thunder, *Nihil turpius* (saith * *Seneca*) *dubio est incerto, pedem modo referente, modo producente.* "What "can there bee more unseemely "in one that should be a faire "disputant, then to be now here, "now there, and so uncertaine, "that one cannot tell where to "find him. He thinkes that there are not Comets in the heavens, because there may be many other reasons of such appearances, but what he knowes not, perhaps (he saies) that argument from the paralax is not sufficient, or if it be, then there may be some deceit in the observation. To this I may safely say, that hee may justly be accounted a weake Mathematician who mistrusts the strength of this argument, nor can hee know much in Astronomy, who under-

* *Epist.* 95.

stands

ſtands not the paralax, which is the foundation of that Science, and I am ſure that hee is a timerous man, who dares not believe the frequent experience of his ſenſes, or truſt to a demonſtration.

True indeed, I grant tis poſſible, that the eye, the *medium*, and the diſtance may al deceive the beholder, but I would have him ſhew which of all theſe was likely to cauſe an error in this obſervation? Mrerely to ſay they might be deceived is no ſufficient anſwer, for by this I might confute the poſitions of all Aſtronomers, and affirme the ſtarres are hard by us, becauſe 'tis poſſible they may be deceived in their obſerving that diſtance. But I forbeare any further reply; my opinion is of that Treatiſe, that either it was ſet forth purpoſely to tempt a confutation, that hee might ſee the opinion of *Galileus* confirmed by others, or elſe it was invented with as much haſte and negligence as it was printed, there be-

being in it almoſt as many faults as lines.

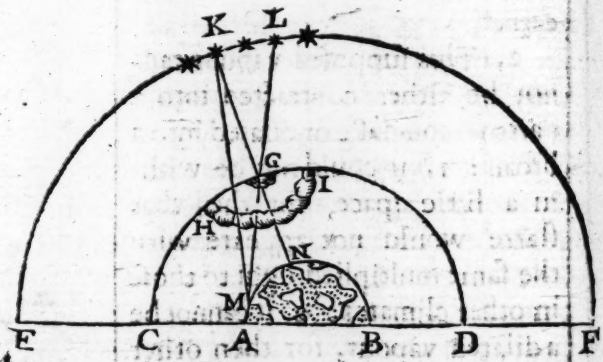
Others thinke that theſe are not any new Comets, but ſome ancient ſtarres that were there before, which now ſhine with that unuſuall brightneſſe, by reaſon of the interpoſition of ſuch vapors which doe multiply their light, and ſo the alteration will be here onely, and not in the heavens. Thus *Ariſtotle* thought the appearance of the milkie way was produced, for he held that there were many little ſtarres, which by their influence did conſtantly attract ſuch a vapour towards that place of heaven, ſo that it alwaies appeared white. Now by the ſame reaſon may a brighter vapor be the cauſe of theſe appearances.

But how probable ſoever this opinion may ſeeme, yet if well conſidered, you ſhall finde it to be altogether abſurd and impoſſible: for,

1. Theſe ſtarres were never ſeene

ſeene there before, and tis not likely that a vapour being hard by us can ſo multiply that light which could not before be at all diſcerned.

2. This ſuppoſed vapour cannot be either contracted into a narrow compaſſe or dilated into a broad: 1. it could not be within a little ſpace, for then that ſtarre would not appeare with the ſame multiplied light to thoſe in other climates: 2. it cannot be a dilated vapour, for then other ſtarres which were diſcerned through the ſame vapour would ſeeme as bigg as that; this argument is the ſame in effect with that of the paralax, as you may ſee in this Figure.



Suppose A B to be a Hemi-spheare of one earth, C D to be the upper part of the highest region, in which there might be either a contracted vapour, as G, or else a dilated one, as H I. Suppose E F likewise to represent halfe the heavens, wherein was this appearing Comet at K. Now I say, that a contracted vapour, as G could not cause this appearance, because an inhabitant at M could not discerne the same starre with

with this brightneſſe, but perhaps another at L, betwixt which the vapour is directly interpoſed. Nor could it be cauſed by a dilated vapour, as H I, becauſe then all the ſtarres that were diſcerned through it would be perceived with the ſame brightneſſe.

Tis neceſſary therefore that the cauſe of this appearance ſhould be in the heavens. And this is granted by the moſt and beſt Aſtronomers. But, ſay ſome, this doth not argue any naturall alteration in thoſe purer bodies, ſince tis probable that the concourſe of many little vagabond ſtarres by the union of their beames may cauſe ſo great a light. Of this opinion were *Anaxagoras* and *Zeno* amongſt the ancient, and *Baptiſta Ciſatus*, *Blancanus*, with others amongſt our modrne Aſtronomers. For, ſay they, when there happens to be a concourſe of ſome few ſtarres, then doe many other flie unto them from all the parts of heaven like

like so many Bees unto their King. But 1. tis not likely that amongst those which wee count the fixed starres there should be any such uncertaine motions, that they can wander from all parts of the heavens, as if Nature had neglected them, or forgot to appoint them a determinate course. 2. If there be such a conflux of these, as of Bees to their King, then what reason is there that they doe not still tarry with it, that so the Comet may not be dissolved? But enough of this. You may commonly see it confuted by many other arguments. Others there are, who affirme these to be some new created stars, produced by an extraordinary supernaturall power. I answer, true indeed, tis possible they might be so, but however tis not likely they were so, since such appearances may be salved some other way, wherefore to fly unto a miracle for such things, were a great injury to nature, and to derogate from

from her skill, an indignity much mis-becomming a man who professes himselfe to bee a Philosopher. *Miraculum* (saith one) *est ignorantiæ Asylum*, a miracle often serves for the receptacle of a lazy ignorance which any industrious Spirit would be ashamed of, it being but an idle way to shift off the labour of any further search. But her's the misery of it, we first tye our selves unto *Aristotle's* principles, and then conclude that nothing could contradict them but a miracle, whereas 'twould be much better for the Common-wealth of learning, if we would ground our principles rather upon the frequent experiences of our owne, then the bare authority of others.

Some there are who thinke, that these Comets are nothing else, but exhalations from our earth, carryed up into the higher parts of the Heaven. So *Pena*,

Tycho Progym. l. 1. c. 9.

Rothmannus & Galileus, but this is not possible, since by computation 'tis found that one of them is above 300 times bigger than the whole Globe of Land and Water. Others therefore have thought that they did proceed from the body of the Sun, and that that Planet onely is *Cometarum officina, unde tanquam emissarii & exploratores emittentur, brevi ad solem rediturí*: The shop or forge of Comets from whence they were sent, like so many spies, that they might in some short space returne againe, but this cannot be, since if so much matter had proceeded from him alone, it would have made a sensible diminution in his body. The Noble *Tycho* therefore thinkes that they consist of some such fluider parts of the Heaven, as the milky way is framed of, which being condenst together, yet not attaining to the consistency of a Starre, is in some

ſome ſpace of time rarifyed againe into its wonted nature. But this is not likely, for if there had beene ſo great a condenſation as to make them ſhine ſo bright and laſt ſo long, they would then ſenſibly have moved downwards towards ſome center of gravity, becauſe whatſoever is condenſt muſt neceſſarily grow heavier, whereas theſe rather ſeemed to aſcend higher, as they laſted longer. But ſome may object, that a thing may be of the ſame weight, when it is rarifed, as it had while it was condenſt, ſo metals when they are melted and when they are cold, ſo water alſo when it is frozen, and when it is fluid, doth not differ in reſpect of gravity. But to theſe I anſwere: Firſt, Metals are not rarified by melting, but molified. Secondly, waters are not properly condenſed but congealed into a harder ſubſtance, the parts being not

contracted closer together, but still possessing the same extension.

And beside, what likely cause can we conceive of this condensation, unlesse there be such qualities there, as there are in our ayer, and then why may not the Planets have the like qualities as our earth? and if so, then 'tis more probable that they are made by the ordinary way of nature, as they are with us, and consist of exhalations from the bodies of the Planets. Nor is this a singular opinion; but it seemed most likely to *Camillus Glorioſus*. *Th. Campanella*, *Fromondus*, with some others. But if you aske whither all these exhalations shall returne, I answer every one into his owne Planet: if it be againe objected, that then there will be so many centers of gravity, and each severall Planet will be a distinct world, I reply, perhaps all of them are so

De Comet. l. 5. c. 4. Apolog. Meteor. l. 3. c. 2. Art. 6.

Iohan. Fabr. Carolus Malaptius de Heliocyc. Scheiner. Rosa Vrsina.

ſo except the Sunne, though *Cuſanus* thinks there is one alſo, and later times have diſcovered ſome leſſer Planets moving round about him. But as for *Saturne*, he hath two Moones on each ſide: *Jupiter* hath foure, that incircle his body with their motion. *Venus* is obſerved to increaſe and decreaſe as the Moone. *Mars*, and all the reſt, derive their light from the Sunne onely. Concerning *Mercury*, there hath beene little or no obſervation, becauſe for the moſt part, he lies hid under the Sunne beames, and ſeldome appeares by himſelfe. So that if you conſider their quantity, their opacity, or theſe other diſcoveries, you ſhall finde it probable enough, that each of them may be a ſeverall world. But this would bee too much for to vent at the firſt: the chiefe thing at which I now ayme in this diſcourſe, is to

prove that there may bee one in the Moone.

It hath beene before confirmed, that there was a ſpheare of thicke vaporous ayer encompaſſing the Moone, as the firſt and ſecond regions doe this earth. I have now ſhewed, that thence ſuch exhalations may proceed as do produce the Comets: now from hence it may probably follow, that there may be winde alſo and raine, with ſuch other meteors as are common amongſt us. This conſequence is ſo dependant, that *Fromondus* dares not deny it, though hee would (as he confeſſes himſelfe) for if the Sunne be able to exhale from them ſuch fumes as may cauſe Comets, why not then ſuch as may cauſe windes, and why not ſuch alſo as may cauſe raine, ſince I have above ſhewed, that there is Sea and Land as with us. Now raine ſeemes to bee more eſpecially requiſite for them, ſince

De meteor. l. 3. c. 2. Art. 6.

since it may allay the heate and scorchings of the Sunne, which he is over their heads. And nature hath thus provided for those in *Peru*, with the other inhabitants under the line.

But if there be such great, and frequent alterations in the Heavens, why cannot we discerne them?

I answere:

1. There may be such, and we not able to perceive them, because of the weakenes of our eye, and the distance of those places from us, they are the words of *Fromondus*, as they are quoted by *Fromondus* in the above cited place) *Possunt magnæ permutationes in cœlo fieri, etiamsi a nobis non conspiciantur, hoc visus nostri debilitas & immensa cœli distantia faciunt.* And unto him assents *Fromondus* himselfe, when a little after hee saies, *Si in sphæris planetarum degeremus, plurima forsan cœlestium mirabilium vel ad oculum adhuc passim*

dispersa videremus, quorum species jam evanesceret nimia spatii intercapedine. "If we did live in the "spheares of the Planets, wee "might there perhaps discerne "many great clouds dispersed "through the whole Heavens, which are not now visible by reason of this great distance.

2. *Maestin* and *Keplar* affirme, that they have seene some of these alterations. The words of *Maestin* are these (as I finde them cited.) *In eclipsi lunari vespere Dominicæ Palmarum Anni* 1605. *in corpore lunæ versus Boream, nigricans quædam macula conspecta fuit, obscurior cætero toto corpore, quod candentis ferri figuram repræsentabat; dixisses nubila in multam regionem extensa pluviis & tempestuosis imbribus gravida, cujusmodi ab excelsorum montium jugis in humiliora convallium loca videre non rarò contingit.* "In that "lunary eclipse which happe-"ned in the even of Palme-sun-"day

Dissert. 2. cum nunc. Galil.

"day in the yeere 1605 there
"was a certaine blackish spot
"discerned in the Northerly
"part of the Moone, being dar-
"ker than any other place of her
"body, and representing the co-
"lour of red hot iron: you might
"conjecture that it was some di-
"lated cloud, being pregnant
"with showers, for thus do such
"lower clouds appeare from the
"tops of high mountaines.

Vnto this I may ad another testimony of *Bapt. Cisatus*, as he is quoted by *Nicembergius*, grounded upon an observation taken 23. yeeres after this of *Messin*, and writ to this *Eusebi Nicemberg.* in a letter by that diligent and judicious Astronomer. The words of it runne thus: *Et quidem in eclipsi nupra solari quæ fuit ipso die natali Christi, observavi clarè in luna soli suppositæ, quidpiam quod valde probat id ipsum quod Cometæ quoq; & maculæ solares urgent, nempe cœlum non esse a tenui-*

Hist. Nat. l. 2. c. 11.

a tenuissore & variationibus aere exempsimus, nam circa lunam advertì esse sphæram seu orbem quendam vaporosum, non secus ac circum terram, adeoq; sicut ex terra in aliquam usq; sphæram vapores & exhalationes expirant, ita quoq; ex luna. "In that late solary eclipse "which happened on Christ-"mas day, when the Moone was "just under the Sunne, I plainly "discerned that in her which "may clearely confirme what "the Comets and Sunnes spots "doe seeme to prove, *viz.* that "the heavens are not solid, "nor freed from those changes "which our aire is liable unto, "for about the Moone I perceived such an orbe, of vaporous "aire, as that is which doth encompasse our earth, and as vapours and exhalations are raised from our earth into this "aire, so are they also from "the Moone.

You see what probable grounds

grounds and plaine testimonies I have brought for the confirmation of this Proposition: many other things in this behalfe might be spoken, which for brevity sake I now omit, and passe vnto the next.

Proposition 13.

That tis probable there may be inhabitants in this other World, but of what kinde they are is vncertaine.

I Have already handled the Seasons and Meteors belonging to this new World: tis requisite that in the next place I should come vnto the third thing which I promised, and to say somewhat of the inhabitants, concerning whom there might be many difficult questions raised, as whether that place be more inconvenient for habitation

tion thereof our World (as *Keplar* thinkes) whether they are the seed of *Adam*, whether they are there in a blessed estate, or else what meanes there may be for their salvation, with many other such uncertaine enquiries, which I shall willingly omit, leaving it to their examination, who have more leisure and learning for the search of such particulars.

Being for mine own part content only to set down such notes belonging unto these which I have observed in other Writers. *Cum tota illa regio nobis ignota sit, remanent inhabitatores illi ignoti penitus*, (saith *Cusanus*) since we know not the regions of that place, wee must be altogether ignorant of the inhabitants. *De docti. ignorantia. l. 2. c. 12.* There hath not yet beene any such discovery concerning these, upon which wee may build a certainty, or good probability: well may we guesse at them, and

that

that too very doubtfully, but we can know nothing, for if we doe hardly guesse aright at things which be upon earth, if with labour we doe finde the things that are at hand, how then can we search out these things that are in heaven? What a little is that which we know, in respect of those many matters contained within this great Vniverse, this whole globe of earth and water? though it seeme to us to be of a large extent, yet it beares not so great a proportion unto the whole frame of Nature, as a small sand doth unto it, and what can such little creatures as we discerne, who are tied to this point of earth? or what can they in the Moone know of us? If wee understand any thing (saith *Esdras*) tis nothing but that which is upon the earth, and he that dwelleth above in the heavens, may onely understand

Wisd. 9. 16.

1 Esd. 4. 21

ſtand the things that are above in the height of the heavens.

So that 'twere a very needleſſe thing for us to ſearch after any particulars, however we may gueſſe in the generall that there are ſome inhabitants in that Planet: for why elſe did providence furniſh that place with all ſuch conveniences of habitation as have beene above declared?

But you will ſay, perhaps, is there not too great and intolerable a heate, ſince the Sunne is in their Zenith every moneth, and doth tarry there ſo long before he leaves it?

I anſwer, 1. This may, perhaps, be remedied (as it is under the line) by the frequency of mid-day ſhowers, which may cloud their Sunne, and coole their earth: 2. The equality of their nights doth much temper the ſcorching of the day, and the extreme cold that comes from

from the one, require ſome ſpace before it can be diſpelled by the other, ſo that the heate ſpending a great while before it can have the victory, hath not afterwards much time to rage in. Wherfore notwithſtanding this, yet that place may remaine habitable. And this was the opinion of the *Cardinal de Cuſa*, when ſpeaking of this Planet, he ſaies, *Hic locus Mundi eſt habitatio hominum & animalium etiam vegetabilium.* "This part of the "world is inhabited by men and "beaſts and plants. To him aſſented *Campanella*, but he cannot determine whether there were men or rather ſome other kinde of creatures. If they were men, then he thinks they could not be infected with *Adams* ſinne; yet perhaps, they had ſome of their owne, which might make them liable to the ſame miſery with us, out of which, perhaps, they were delivered

De doct. ign. l. 2. c. 12.

livered by the same means as we, the death of Christ, and thus he thinks that place of the *Ephesians* may be interpreted, where the Apostle saies, *God gathered all things together in Christ, both which are in earth, and which are in the heavens*. So also that of the same Apostle to the *Colossians*, where hee saies, that *it pleased the Father to reconcile all things unto himselfe by Christ, whether they be things in earth, or things in heaven.*

Ephes. 1. 10.

Col. 1. 20.

But I dare not jest with divine truths, or apply these places according as fancy directs. As I thinke this opinion doth not any where contradict Scripture, so I thinke likewise, that it cannot be proved from it, wherefore *Campanella's* second conjecture may be more probable, that the inhabitants of that world, are not men as we are, but some other kinde of creatures which beare some proportion

portion and likenesse to our natures, and *Cusanus* too thinks they differ from us in many respects; I will set downe his words as they may be found in the above cited place, *Suspicamus in regione solis magis esse solares, claros & illuminatos intellectuares habitatores, spiritualiores etiam quam in luna, ubi magis lunatici, & in terra, magis materiales, & crassi, ut illi intellectuales naturæ solares sint multum in actu & parum in potentia; terreni vero magis in potentia, & parum in actu; lunares in medio fluctuantes. Hoc quidem opinamur ex influentia ignili solis aquatica simul & aeria lunæ, & gravedine materiali terræ, & consimiliter de aliis stellarum regionibus suspicantes, nullam habitatoribus carere, quasi tot sint partes particulares mundiales unius universi, quot sunt stellæ quarum non est numerus, nisi apud eum qui omnia in numero creavit.*

"We may conjecture (ſaith "he) the inhabiters of the Sunne "are like to the nature of that "Planet, more cleare and bright, "more intellectuall and ſpiri- "tuall than thoſe in the Moone "where they are neerer to the "nature of that duller Planet, "and thoſe of the earth being "more groſſe and materiall "than either, ſo that theſe in- "tellectuall natures in the Sun, "are more forme than matter, "thoſe in the earth more mat- "ter than forme, and thoſe in "the Moone betwixt both. "This we may gueſſe from the "fierie influence of the Sunne, "the watery and aereous influ- "ence of the Moone, as alſo "the materiall heavineſſe of the "earth. In ſome ſuch manner "likewiſe is it with the regions "of the other ſtarres, for wee "conjecture that none of them "are without inhabitants, but "that there are ſo many particu-

"lar

"lar worlds and parts of this "one universe, as there are ſtars "which are innumerable, un-"leſſe it be to him who created "all things in number.

For he held that the ſtars were not all in one equall orbe as wee commonly ſuppoſe, but that ſome were farre higher than o-thers which made them appeare leſſe, and that many others were ſo farre above any of theſe, that they were altogether inviſible unto us. An opinion (which as I conceive) hath not any great probability for it, nor certainty againſt it.

The Prieſt of *Saturne* relating to *Plutarch* (as he faignes it) the nature of theſe Selenites, told him they were of divers diſpo-ſitions, ſome deſiring to live in the lower parts of the Moone, where they might looke downe-wards upon us, while others were more ſurely mounted aloft, all of them ſhining like the rayes of

the Sunne, and as being victorious are crowned with garlands made with the wings of *Euſtathia* or *Conſtancie*.

It hath beene the opinion amongſt ſome of the Ancients, that their heavens and Elyſian fields were in the Moone where the aire is moſt quiet and pure. Thus *Socrates*, thus *Plato*, with his followers, did eſteeme this to be the place where thoſe purer ſoules inhabite, who are freed from the Sepulchre, and contagion of the body. And by the Fable of *Ceres*, continually wandring in ſearch of her daughter *Proſerpina*, is meant nothing elſe but the longing deſire of men, who live upon *Ceres* earth, to attaine a place in *Proſerpina*, the Moone or heaven.

Nat. Com. l. 3. c. 19.

Plutarch alſo ſeemes to aſſent unto this, but he thinkes moreover, that there are two places of happineſſe anſwerable to thoſe two parts which he fancies to re-

remaine of a man when hee is dead, the ſoule and the vnderſtanding; the ſoule he thinkes is made of the Moone, and as our bodies doe ſo proceede from the duſt of this earth, that they ſhall returne to it hereafter, ſo our ſoules were generated out of that Planet, and ſhall be reſolved into it againe, whereas the vnderſtanding ſhall aſcend vnto the Sun, out of which it was made, where it ſhall poſſeſſe an eternity of well being, and farre greater happineſſe than that which is enjoyed in the Moone. So that when a man dies, if his ſoule be much polluted, then muſt it wander up and downe in the middle regions of the aire where hell is, and there ſuffer vnſpeakbale torments for thoſe ſinnes whereof it is guilty. Whereas the ſoules of better men, when they have in ſome ſpace of time beene purged from that impurity which they did derive from the body,

then doe they returne into the Moone, where they are possest with such a joy, as those men feele who professe holy mysteries, from which place (saith he) some are sent downe to have the superintendance of oracles, being diligent either in the preservation of the good, either from or in all perills, and the prevention or punishment of all wicked actions, but if in these imployments they mis-behave themselves, then are they againe to be imprisoned in a body, otherwise they remaine in the Moone till their body be resolved into it, and the understanding being cleared from all impediments, ascends to the Sun which is its proper place. But this requires a diverse space of time, according to the divers affections of the soule. As for those who have beene retired and honest, addicting themselves to a studious and quiet life, these are quickly preferred to a higher

higher happineſſe. But as for ſuch who have buſied themſelves in many broyles, or have beene vehement in the proſecution of any luſt, as the ambitious, the amorous, the wrathfull man, theſe ſtill retaine the glimpſes and dreames of ſuch things as they have performed in their bodies, which makes them either altogether unfit to remaine there where they are, or elſe keepes them long ere they can put off their ſoules. Thus you ſee *Plutarchs* opinion concerning the inhabitants and neighbours of the Moone, which (according to the manner of the Academickes) hee delivers in a third perſon; you ſee he makes that Planet an inferiour kind of heaven, and though he differ in many circumſtances, yet doth hee deſcribe it to be ſome ſuch place, as wee ſuppoſe Paradiſe to be. You ſee likewiſe his opinion concerning the place of damned ſpi-

rits, that it is in the middle region of the aire, and in neither of these is her singular, but some more late and Orthodox Writers have agreed with him. As for the place of hell, many think it may be in the aire, as well as any where else.

De Civit. Dei. l. 22. c. 16. True indeede, S^t. *Austin* affirmes that this place cannot be discovered; But others there are who can shew the situation of it out of Scripture; Some holding it to be in some other world without this, because our Saviour calls

Mat. 25. 30. σκότος ἐξώτερον, outward darkenesse. But the most will have it placed towards the

Eph. 4. 9. center of our earth, because 'tis said, Christ descended into the lower parts of the earth, and some of these are so confident, that this is its situation, that they can describe you its bignesse also, and of what capacity it is. *Francis Ribera* in his Cõment on the *Revelations*, speaking of those words,

words, where tis ſaid, that the blood went out of the wine-preſſe, even unto the horſes bridles by the ſpace of one thouſand and ſixe hundred furlongs, interprets them to be meant of hell, and that that number expreſſes the diameter of its concavity, which is 200 *Italian* miles; but *Leſſius* thinkes that this opinion gives them too much roome in hell, and therefore he gueſſes that 'tis not ſo wide; for (ſaith hee) the diameter of one league being cubically multiplyed, will make a ſpheare capable of 800000 millions of damned bodies, allowing to each ſixe foot in the ſquare, whereas (ſaies he) tis certaine that there ſhall not be one hundred thouſand millions in all that ſhall be damned. You ſee the bold *Ieſuit* was carefull that every one ſhould have but roome enough in hell, and by the ſtrangeneſſe of the conjecture, you may gueſſe that he had rather

Rev. 14. 20

De Morib. div. l. 13. c. 24.

rather be absurd, than seeme either uncharitable or ignorant. I remember there is a relation in *Pliny*, how that *Dionysiodorus* a Mathematician, being dead, did send a letter from this place to some of his friends upon earth, to certifie them what distance there was betwixt the center and superficies: hee might have done well to have prevented this controversie, and enformed them the utmost capacity of that place. However, certaine it is, that that number cannot be knowne, and probable it is, that the place is not yet determined, but that hell is there where there is any tormented soule, which may be in the regions of the aire as well as in the center; but of this onely occasionally, and by reason of *Plutarchs* opinion concerning those that are round about the Moone; as for the Moone it selfe, hee esteemes it to be a lower kind of heaven, and therefore

therefore in another place hee calls it a terreſtriall ſtarre, and an Olympian or celeſtiall earth anſwerable, as I conceive, to the paradiſe of the Schoolemen, and that paradiſe was either in or neere the Moone, is the opinion of ſome later Writers, who derived it (in all likelihood) from the aſſertion of *Plato*, and perhaps, this of *Plutarch*. *Toſtatus* laies this opinion upon *Iſidor. Hiſpalenſis*, and the venerable *Bede*; and *Pererius* fathers it upon *Strabus* and *Rabanus* his Maſter. Some would have it to be ſituated in ſuch a place as could not be diſcovered, which cauſed the penman of *Eſdras* to make it a harder matter to know the outgoings of Paradiſe, then to weigh the weight of the fire, or meaſure the blaſts of wind, or call againe a day that is paſt. But notwithſtanding this, there be ſome others who thinke that it is on the top of ſome high mountaine under

Curſitent oracula.

Sr. *W. Raw. l.* 1. *c.* 3. § 7.

in Gen.

2 Eſd. 4. 7.

den the line, and theſe interpreted the torrid Zone to be the flaming ſword whereby Paradiſe was guarded. 'Tis the conſent of divers others, who agree in this, that Paradiſe is ſituated in ſome high and eminent place. So *Toſtatus*: *Eſt etiam Paradiſus ſitu altiſſimus, ſupra omnem terræ altitudinem*, "Paradiſe is ſituated in "ſome high place above the "earth: and therefore in his Cõment upon the 49. of *Geneſis*, he underſtands the bleſſing of *Jacob* concerning the everlaſting hills to be meant of Paradiſe, and the bleſſing it ſelfe to be nothing elſe but a promiſe of Chriſts comming, by whoſe paſſion the gates of Paradiſe ſhould be opened. Vnto him aſſented *Rupertus*, *Scotus*, and moſt of the other Schoolemen, as I find them cited by *Pererius*, and out of him in S^r *W. Rawleigh*. Their reaſon was this: becauſe in probability this place was not overflowed by

In Geneſ.

Comment. in 2. Gen. v. 8. l. 1. c. 3. § 6. 7.

by the flood, ſince there were no ſinners there which might draw that curſe upon it. Nay *Toſtatus* thinkes that the body of *Enoch* was kept there, and ſome of the Fathers, as *Tertullian* and *Auſtin* have affirmed, that the bleſſed ſoules were reſerved in that place till the day of judgement, and therefore 'tis likely that it was not overflowed by the flood; and beſides, ſince all men ſhould have went naked if *Adam* had not fell, 'tis requiſite therefore that it ſhould be ſituated in ſome ſuch place where it might be priviledged from the extremities of heat and cold. But now this could not be (they (thought) ſo conveniently in any lower, as it might in ſome higher aire. For theſe and ſuch like conſiderations have ſo many affirmed that Paradiſe was in a high elevated place, which ſome have conceived could be no where but in the Moone: For it

it could not be in the top of any mountaine, nor can we thinke of any other body separated from this earth which can be a more convenient place for habitation than this Planet, therefore they concluded that it was there.

It could not be on the top of any mountaine.

Gen. 7. 19. 1. Because wee have expresse Scripture, that the highest of them was overflowed.

2. Because it must be of a greater extension, and not some small patch of ground, since tis likely all men should have lived there, if *Adam* had not fell. But for a satisfaction of these arguments, together with a farther discourse of Paradise, I shall referre you to those who have written purposely upon this subject. Being content for my owne part to have spoken so much of it, as may conduce to shew the opinion of others concerning the inhabitants of the

Moone

Moone, I dare not my ſelfe affirme any thing of theſe Selenites, becauſe I know not any ground whereon to build any probable opinion. But I thinke that future ages will diſcover more; and our poſterity, perhaps, may invent ſome meanes for our better acquaintance with theſe inhabitants. Tis the method of providence not preſently to ſhew us all, but to lead us a long from the knowledge of one thing to another. 'Twas a great while ere the Planets were diſtinguiſhed from the fixed ſtars, and ſome time after that ere the morning and evening ſtarre were found to be the ſame, and in greater ſpace I doubt not but this alſo, and farre greater myſteries will be diſcovered. In the firſt ages of the world the Iſlanders either thought themſelves to be the onely dwellers upon the earth, or elſe if there were any other, yet they could not poſſibly

sibly conceive how they might have any commerce with them, being severed by the deepe and broad sea, but the aftertimes found out the invention of ships, in which notwithstanding none but some bold daring men durst venture, there being few so resolute as to commit themselves unto the vast Ocean, and yet now how easie a thing is this, even to a timorous and cowardly nature? So, perhaps, there may be some other meanes invented for a conveyance to the Moone, and though it may seeme a terrible and impossible thing ever to passe through the vast spaces of the aire, yet no question there would be some men who durst venture this as well as the other. True indeed, I cannot conceive any possible meanes for the like discovery of this conjecture, since there can be no sailing to the Moone, unlesse that were true which the Poets doe but feigne, that

that ſhee made her bed in the Sea. Wee have not now any *Drake* or *Columbus* to undertake this voiage, or any *Dædalus* to invent a conveyance through the aire. However, I doubt not but that time who is ſtill the father of new truths, and hath revealed unto us many things which our Anceſtours were ignorant of, will alſo manifeſt to our poſterity, that which we now deſire, but cannot know. *Veniet tempus* (ſaith *Seneca*) *quo iſta quæ nunc latent, in lucem dies extrahet, & longioris ævi diligentia.* Time will come when the indeavours of after ages ſhall bring ſuch things to light, as now lie hid in obſcurity. Arts are not yet come to their Solſtice, but the induſtry of future times aſſiſted with the labours of their forefathers, may reach unto that height which wee could not attaine to. *Veniet tempus quo poſteri noſtri nos tam aperta neſciſſe*

Nat. Quæſt. l. 7. c. 25.

mirentur. As wee now wonder at the blindneſſe of our Anceſtors, who were not able to diſcerne ſuch things as ſeeme plaine and obvious unto us. So will our poſterity admire our ignorance in as perſpicuous matters. *Keplar* doubts not, but that as ſoone as the art of flying is found out, ſome of their Nation will make one of the firſt colonies that ſhall inhabite that other world. But I leave this and the like conjectures to the fancie of the reader; Deſiring now to finiſh this Diſcourſe, wherein I have in ſome meaſure proved what at the firſt I promiſed, a world in the Moone. However, I am not ſo reſolute in this, that I thinke tis neceſſary there muſt be one, but my opinion is, that tis poſſible there may be, and tis probable there is another habitable world in that Planet. And this was that I under-

undertooke to prove. In the purſuit whereof, if I have ſhewed much weakneſſe or indiſcretion; I ſhall willingly ſubmit my ſelfe to the reaſon and cenſure of the more judicious.

The Propoſitions that are proved in this Diſcourſe.

Propoſition 1.

That the ſtrangeneſſe of this opinion is no ſufficient reaſon why it ſhould be rejected, becauſe other certaine truths have beene formerly eſteemed ridiculous, and great abſurdities entertayned by common conſent.

By way of Preface.

Prop. 2.

That a plurality of worlds do's not contradict any principle of reaſon or faith.

Prop. 3.

Prop. 3.

That the heavens doe not consist of any such pure matter which can priviledge them from the like change and corruption, as these inferiour bodies are liable unto.

Prop. 4.

That the Moone is a solid, compacted, opacous body.

Prop. 5.

That the Moone hath not any light of her owne.

Prop. 6.

That there is a world in the Moone, hath beene the direct opinion of many ancient, with some moderne Mathematicians, and may probably be deduced from the tenents of others.

Prop. 7.

Prop. 7.

That thoſe ſpots and brighter parts which by our ſight may bee diſtinguiſhed in the Moone, doe ſhew the difference betwixt the Sea and Land in that other World.

Prop. 8.

That the ſpots repreſent the Sea, and the brighter parts the Land.

Prop. 9.

That there are high Mountaines, deepe vallies, and ſpacious plaines in the body of the Moone.

Prop. 10.

That there is an Atmo-ſphæra, or an orbe of groſſe vaporous aire, immediately encompaſſing the body of the Moone.

Prop. 11.

Prop. 11.

That as their world is our Moone, so our world is their Moone.

Prop. 12.

That tis probable there may bee such Meteors belonging to that world in the Moone, as there are with us.

Prop. 13.

That tis probable there may be inhabitants in this other World, but of what kinde they are is uncertaine.

FINIS.